Appendix A

Organization of Categories

Facilities and Equipment (F&E) Fiscal Year (FY) 2003 Budget Line Items (BLI) have been assigned to one of five categories; all costs related to Personnel, Compensation, Benefits, and Travel (PCB&T) are included in Category 6. The categories are:

- Category 1: Improve Aviation Safety
  - Subcategory 1AXX: Reduce Commercial Aviation Fatalities
  - Subcategory 1BXX: Reduce General Aviation Fatalities
  - Subcategory 1CXX: Overall Aviation Safety Improvement
- Category 2: Improve Efficiency of the Air Traffic Control System
  - Subcategory 2AXX: Increase Number of Flights Handled by Airports
  - Subcategory 2BXX: Improve Routing Efficiency for Flights En Route
  - Subcategory 2CXX: Overall National Airspace System Improvement
- Category 3: Increase Capacity of the National Airspace System
  - Subcategory 3AXX: Increase Capability of En Route Systems to Handle Flights
- Category 4: Improve the Reliability of the National Airspace System
  - Subcategory 4AXX: Replace Terminal Equipment to Prevent Decreased Performance
  - Subcategory 4BXX: Replace En Route Equipment to Prevent Decreased Performance
  - Subcategory 4CXX: Replace Supporting Systems that Impact Overall National Airspace System Performance
- Category 5: Improve the Efficiency of Mission Support
  - Subcategory 5AXX: Increase Efficiency of Investment Management
  - Subcategory 5BXX: Minimize Environmental Impact of Aviation Facilities
- Category 6: Personnel, Compensation, Benefits, and Travel Only

Each BLI may contain one or more Capital Investment Plan (CIP) projects, but it is assigned to only one category. In general, many of the Federal Aviation Administration (FAA) capital investments will contribute to more than one goal.

By direction of the Office of Management and Budget (OMB), all projects are aligned to Department of Transportation (DOT) and corresponding FAA Goals. The contributions of each CIP project in meeting DOT/FAA Goals are supplied in the "Narratives for Primary or Secondary Goals" sections.

In this CIP, category assignment for each BLI was accomplished by reviewing all CIP projects and their goals and determining the most significant contribution to one goal in terms of funding and outcome contribution.

The definitions of categories and DOT and FAA Goals are provided at the beginning of each category.

Format of Appendix A

The sections of this appendix present information by F&E projects organized in the following format:

Category Number: BLI Number BLI Name
Project Name #1

Primary Outcome Goal: FAA Goal: The primary goal that the capital investment supports.

Narrative for Primary Outcome Goal:
Description of the outcome or outputs that contribute to changes in capabilities or services.

Category 1

Definition of Category 1: Improve Aviation Safety

This category identifies programs that contribute to the aviation safety and security relationship within the National Airspace System (NAS). It contains the outcome and output goals of safety and security.

1. FAA Goal: Safety: *Reduce fatal aviation accident rates by 80 percent in 10 years.*
2. FAA Goal: National Security: *Prevent security incidents in the aviation system.*

1. Strategies to Achieve FAA Safety Goals:

Accident Prevention: *Prevent accidents before they happen through appropriate, targeted, systematic interventions in the aviation system.*
Safety Information Sharing and Analysis: *Develop partnerships with the aviation community to share data and information, supporting safe, secure aviation.*
Certification and Surveillance: *Develop new approaches to working with others on certification, inspection, and surveillance, and target FAA resources.*

FAA Annual Performance Goals:

Air Carrier Fatal Aircraft Rate *– Reduce the fatal aviation accident rate for commercial air carriers from a 1994-1996 baseline of 0.051 fatal accidents per 100,000 departures. The Fiscal Year (FY) 2003 target is 0.033 per 100,000 departures–with the reduction to be achieved in six key areas outlined in the Safer Skies Agenda.*
General Aviation (GA) Fatal Aircraft Rate *– By 2007, reduce the GA fatal accidents by an amount that results in a 20 percent improvement from the projected total for that year. Assuming a 1.6 percent annual growth in activity, the annual number of GA fatal accidents is projected to grow from the three-year baseline of 379 for 1996 to 1998 to be 437 in 2007. The 2003 target is 374.*
Operational Errors *– Reduce operational errors per one million activities. The FY 2003 goal is no more than 6.5 per million.*
Runway Incursions *– Reduce the number and rate (per 100,000 operations) of runway incursions. The FY 2003 goal is no more than 56 runway incursions per 0.08 of 100,000 operations.*

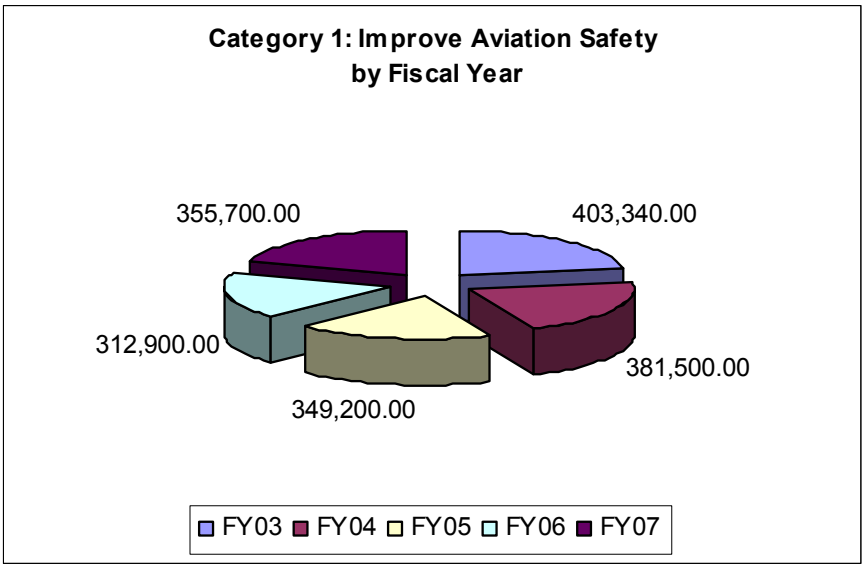
2. Strategies to Achieve FAA National Security Goals:

Security Baseline: *Continue to improve the baseline security system for civil aviation and address vulnerabilities that may remain.*
Information Security: *Develop and implement a comprehensive information system security (ISS) program and security activities to protect the national airspace and mission support systems.*

FAA Annual Performance Goals*:*

Explosive Device and Weapons Detection *– Increase the detection rate for explosives and weapons that may be brought aboard an aircraft. The detection rates are sensitive information protected under Code of Federal Regulations (CFR) Part 191.*
Information Security *– Develop and implement a comprehensive ISS program and security activities to protect the national airspace and mission support systems.*

The following graph indicates distribution of funding for F&E programs in Category 1: Improve Aviation Safety for FY 2003 to 2007. Funding in thousands.



Category 1: 1A01 Terminal Business Unit: 1A01A Next Generation Weather Radar – Provide

- **Next Generation Weather Radar – Open Systems Upgrades**
- **Medium-Intensity Airport Weather System**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve NAS safety through better detection and characterization of hazardous weather phenomena, which is achieved by technology upgrades to the next generation weather radar (NEXRAD) systems, and implementation of medium intensity airport weather system (MIAWS) to airports with limited wind shear detection capabilities. MIAWS will be used to alert air traffic control to the severity, location, movement, and expected duration of hazardous weather phenomena.

The initial objective of MIAWS, a product improvement under the NEXRAD Program, is to provide a low-cost, real-time weather display of storm positions and estimated storm tracks at airports utilizing NEXRAD product data as its primary input. MIAWS provides enhanced capabilities to medium-intensity air traffic control towers (ATCT) at a significantly lower cost than systems employed at high-intensity airports. MIAWS also provides weather situational awareness information—storm position, estimated storm tracks, and precipitation alerts—and user interfaces with air traffic via situation displays and ribbon terminals to medium-sized airports. MIAWS provides air traffic control with real-time critical hazardous weather information needed to safely and efficiently manage the flow of air traffic. NEXRAD provides a national network of weather radar currently in use that detects, processes, distributes, and displays hazardous and routine weather information.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Reduce weather-related delays through better strategic awareness and communication of weather phenomena. Communication across the NAS will support decisions concerning arrival and departure routes and reconfiguration of airport runways.

Category 1: 1A01 Terminal Business Unit: 1A01B Terminal Doppler Weather Radar – Provide

- **Terminal Doppler Weather Radar – Product Improvements**
- **Terminal Doppler Weather Radar – Service Life Extension Program**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative of Primary Outcome Goal:
Increase aviation safety with the accurate and timely detection of hazardous aviation weather conditions. The primary mission of the terminal doppler weather radar (TDWR) is to enhance the safety of air travel through timely detection and reporting of hazardous wind shear in and near an airport's terminal approach and departure zone by detecting microburst and gust fronts.

Air traffic control radar currently detects the location and intensity of precipitation. The presence, location, and altitude of hazardous weather phenomena, such as microburst and gust fronts producing wind shear conditions, are not adequately determined. The TDWR Program establishes a terminal aviation weather radar capability that provides accurate aviation weather products (microburst, gust fronts, and related hazardous wind shear), and furnishes software algorithms to improve the radar presentation of weather data.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Improve the management of air traffic in the terminal area through TDWR-derived forecasts of gust front-induced wind shifts and precipitation.

The TDWR deployed at commercial airports have reduced weather related arrival and/or departure delays, resulting in savings in aviation fuel consumption. TDWR provides improved runway/airfield management through the detection and display of microburst, gust fronts, precipitation, and the prediction of wind shifts.

Category 1: 1A01 Terminal Business Unit: 1A01C Airport Surface Detection Equipment
Airport Surface Movement Detection Equipment Model 3 Service Life Extension Program

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Extend service life of airport surface detection equipment (ASDE) model 3, which provides air traffic controllers with a video display of aircraft, vehicles, and obstacles on an airport's runways and taxiways, to continue to assist controllers in safely managing terminal traffic. Because the ASDE-3 radar is the primary detection sensor input to the airport movement area safety system (AMASS), extending the service life of the ASDE-3 positively impacts the service life of the AMASS.

The ASDE-3 provides positive ground surveillance and assistance to air traffic controllers in expediting aircraft flow during conditions of restricted visibility. The ASDE-3 radar assists the ground controller to prevent collision situations, and provides orderly movement of aircraft and ground vehicles on the airport surface when visibility restrictions prevent controllers, pilots, or vehicle operators from seeing other ground traffic on the airport surface. The service life extension program (SLEP) addresses obsolete parts and parts that impact the reliability and maintainability; the SLEP activities will ultimately extend the useful life of the ASDE-3 an additional 10 years beyond the original 20-year life cycle to 2015.

Category 1: 1A01 Terminal Business Unit: 1A01D Airport Movement Area Safety System
Airport Movement Area Safety System

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve system safety in the terminal area through the use of surface detection hardware and software that provides air traffic controllers with both a video display of aircraft, vehicles, and obstacles on the airport's runways and taxiways and an automatically generated visual and aural alarm alert to aid in the prevention of loss of life and property as a result of runway incursions and other potential unsafe conditions.

The AMASS adds an automation enhancement to ASDE-3 that provides tower controllers with a visual and aural alarm of potential collisions on the airport's surface. The AMASS is comprised of two subsystems—the AMASS processor and the terminal automation interface unit (TAIU). The TAIU interfaces with the airport surveillance radar (ASR) model 9 and the automated radar terminal system (ARTS) automation equipment to provide airborne aircraft position and runway prediction information to the AMASS for alert processing. The AMASS is used as a safety system by ground controllers at operational ASDE-3 sites.

Category 1: 1A01 Terminal Business Unit: 1A01E Weather Systems Processor
Airport Surveillance Radar Weather Systems Processor

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve aviation safety by providing air traffic controllers warnings of wind shear and microburst events for immediate issue to pilots. The weather systems processor (WSP), a low cost alternative to TDWR, provides hazardous weather situational awareness between tower and terminal radar approach control (TRACON) personnel, including predictions of gust fronts and storm cell motion that will allow improved runway reconfiguration in advance of future wind shifts.

To improve flight safety, the FAA installed WSPs at medium- and large-sized airports that could not site a TDWR to detect and warn pilots of hazardous wind shears and microbursts in the vicinity of runways. The WSP provides advance warning to controllers and pilots of hazardous wind shear and other hazardous weather conditions.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Improve system efficiency by significantly increasing aviation fuel savings, improving airport capacity under hazardous weather conditions and reducing hazardous weather flight delays. Operational benefits of the system include real-time detection of hazardous weather and microbursts and increased safety (accident avoidance) and capacity (more runway availability and better efficiency of operation during thunderstorm days).

The WSP Program establishes a terminal aviation weather radar capability at ASR-equipped airports that do not receive the TDWR. These airports have a high exposure to wind shear and conduct medium to high amounts of air traffic operations. Sixty-five percent of annual air traffic control system delays are attributable to weather, and annually account for $1.7 billion of direct costs to the airline industry.

Category 1: 1A01 Terminal Business Unit: 1A01F Airport Surface Detection Equipment – Model X
Airport Surface Detection Equipment Model X

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Provide detailed coverage of runways and taxiways and alert air traffic controllers, both aurally and visually, to potential collisions. Provide controllers with improved situational awareness, which will reduce runway collision risks, ultimately improving the safety of the nation's runways.

The airport surface environment is becoming an increasingly complex place. As air traffic increases, the needs of air traffic control are expanding to fully utilize runways and taxiways, even during low visibility situations and inclement weather. The ASDE-x system's technologies (surveillance, conflict detection and alerting, and controller display) will improve runway safety and prevent runway incursion accidents by increasing airport controller situational awareness.

ASDE-x improves controller situational awareness by providing visual representation of the traffic situation on the airport surface in the form of aircraft position information, flight call signs, and by alerting controllers through aural and visual alarms that a potential accident may occur. The ASDE-x system depicts aircraft vehicle position and identification information overlaid on a color map showing the surface movement area and arrival corridors during all weather conditions.

The core ASDE-x system will consist of a primary radar subsystem, multilateration/automatic dependent surveillance broadcast (ADS-B) subsystem, multi-processor/data fusion subsystem, and controller display. System

enhancements include safety logic (to provide conflict detection alerting), dual-radar fusion, ASDE-3 fusion, and the remote tower design. These planned enhancements include audible and visual warning of impending conflicts or collisions, and the capability to accept future surveillance sensor inputs. ASDE-x was designed for airports that are not covered by the ASDE-3/AMASS projects. This system, which is modular and scalable, will detect and identify cooperative (transponder equipped) and non-cooperative aircraft/vehicles, provide interface and fusing capability of multiple surveillance sensor inputs, and supply single target display of position and flight identification information to the controller.

Category 1: 1A02 Aviation Weather Service Improvements

- **Integrated Terminal Weather Systems – Development/Procurement**
- **Integrated Terminal Weather Systems – Corridor Integrated Weather System**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve safety by detection, forecasting, processing, and delivery of aviation weather information to pilots, airline operations centers (AOC), and controllers. The integrated terminal weather system (ITWS) provides terminal aviation weather data and integrated products from other sensors, including TDWR, NEXRAD, low level wind shear alert system (LLWAS), and automated surface observing system (ASOS). ITWS will cover 45 high-activity airports that have significant convective weather.

ITWS will provide products to terminal aviation system users that characterize the current terminal weather situation in addition to providing a forecast of anticipated weather conditions for the next 20 minutes. These objectives will be achieved by integrating data and products from various FAA and National Weather Service (NWS) sensors (e.g., TDWR, ASR, NEXRAD, LLWAS, and ASOS), aircraft (via the meteorological data collection and reporting system), and other NWS weather information systems. Products generated by ITWS will include wind shear and microburst predictions, storm cell and lightning information, and terminal area winds aloft. ITWS is to acquire and deploy 37 ITWS systems. A single TRACON can cover multiple airports; therefore, 34 ITWSs at TRACONs will cover 46 airports.

Category 1: 1A03 Low Level Wind Shear Alert System – Upgrade

- **Low Level Wind Shear Alert System – Upgrade Low Level Wind Shear Alert System to Expanded Network Configuration**
- **Low Level Wind Shear Alert System – Disposal/Decommissioning of Low Level Wind Shear Alert System Model 2**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Monitor the airport area and alert pilots, through the air traffic controllers, when hazardous wind shear conditions are detected. Severe wind shear/microburst conditions that occur at low altitudes near airports can pose a significant threat to aircraft during takeoff or landing. Wind shear conditions are common in the United States, especially in areas where thunderstorms are frequent.

The LLWAS-Relocation/Sustain upgrade will improve accuracy and increase the probability of detection of wind shear events. The LLWAS-Relocation/Sustain upgrade adds additional wind speed and direction remote stations, realigns the remote station poles to new runway configurations, focuses alerts to specific runways, and extends the service life of the equipment with modern technology.

There are three projects running simultaneously within the overall LLWAS-Relocation/Sustain Program:

- LLWAS Pole Relocation Project: Improve current performance by relocating/replacing and adding height to remote stations and poles.

- LLWAS Sustainment Project: Upgrade 40 stand-alone LLWAS-2 systems to the LLWAS-Network Expansion performance level and address system supportability issues. The LLWAS-2's upgrade to the sustainment configuration will reduce costs by eliminating obsolete equipment. When the ASR-9 associated with the Daytona Beach Airport was relocated, the Daytona Beach site became ineligible for ASR/WSP because the radar was sited outside the range parameter necessary for WSP operation. Therefore, Daytona Beach has become the 40th candidate for the LLWAS sustainment site.
- The LLWAS-Relocation/Sustain Program: Also upgrade nine existing LLWAS-Network Expansion sites to the LLWAS-Network Expansion++ configuration. The LLWAS-Network Expansion++ rehosted the LLWAS-Network Expansion algorithm on a modern computer platform and upgraded much of the hardware to extend its service life. The LLWAS-Network Expansion++ is a separate and more robust configuration from the LLWAS-Relocation/Sustain that is used especially at large and busy airports with multiple runways. The nine LLWAS-Network Expansion sites will be upgraded to LLWAS-Network Expansion++ as part of the sustainment project.

The LLWAS Disposal/Decommissioning project disposes of LLWAS-2 systems that have been replaced by WSP or TDWR systems. Disposal of 40 LLWAS-2 systems is scheduled to begin in FY 2004 in order to restore the sites to their original condition.

Category 1: 1A04 Aviation Safety Analysis System
(A) Aviation Safety Analysis System
(B) System Approach for Safety Oversight

(A) Aviation Safety Analysis System

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve aviation safety and security through enhanced effectiveness in safety and security regulation and oversight of the civil aviation industry by improving the automation safety and security subsystems and tools that are essential for the safety and security work forces to accomplish their responsibilities. Provide information technology (IT) infrastructure and develop systems to facilitate partnerships with the aviation community to share data and information, supporting safe and secure aviation. The infrastructure and systems provide the tools necessary to enhance the effectiveness of the FAA's certification, inspection, and surveillance responsibilities in the safety and security areas in civil aviation.

Enhancements in automation safety and security systems and infrastructure are essential to establish safety and security standards; monitor aviation safety and security performance; conduct aviation safety education; perform safety and security research; issue and maintain certificates for the design and manufacture of aircraft and licenses for air operators and airmen, including medical certificates; designee monitor; maintain aircraft registration records; manage the FAA accident investigation program; and manage the FAA rulemaking program, which is the primary means by which safety and security standards and policies are disseminated.

(B) System Approach for Safety Oversight

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Provide the capability to identify aircraft accident causal factors and mitigate risks within all components of the system through the integration of business processes. The system approach for safety oversight (SASO) expands oversight analysis by providing tools to use to identify patterns of sub critical individual failures that combine to create an accident. It provides a complete set of analytical tools to allow targeted inspections and identify actions in the areas of highest potential vulnerability and probability of hazard.

Category 1: 1A05 Integrated Flight Quality Assurance
Integrated Flight Quality Assurance System

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Provide an electronic capability for the collection and analysis of flight data from airline operations. Development of a secure Internet-based FAA electronic data acquisition and information infrastructure will allow the FAA to access airline flight operational quality assurance (FOQA) trend data for NAS oversight. It will also be used to develop FAA policy and conduct informed decision-making regarding aviation safety for the airlines.

Category 1: 1A06 Safety Performance Analysis System
Safety Performance Analysis System

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Assist aviation safety inspectors (ASI) by targeting critical areas for inspection. This system provides the capability to target certificate holders that pose a greater safety risk and dynamically modify the surveillance work programs. Additionally, it allows the FAA to monitor the status of aging fleet of aircraft and increases the industry accountability for aviation safety.

Category 1: 1A07 Performance Enhancement Systems
Portable Performance Support System

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Contribute to improved aviation safety by providing ASIs mobile, transportable electronic tools to identify and track potential violations (based on past performance) and violations of safety standards. Identify the potential for discrepancies and violations for the aircraft fleet. This portable tool provides the ASIs an on the spot tool to use while conducting surveillance within their areas of jurisdiction.

Category 1: 1B01 Safe Flight 21
(A) Safe Flight 21 – Alaska Capstone Initiative
(B) Safe Flight 21 – Ohio Valley Prototype Project
(C) Automatic Dependent Surveillance Broadcast – Advanced Technology Development and Prototyping

(A) Safe Flight 21 – Alaska Capstone Initiative

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Reduce the number and rate of accidents, fatalities, and property damage, and improve aviation safety in Alaska through the integration of interdependent technologies. Capstone provides an improved ground and air infrastructure that furnishes pilots with better information on the location and severity of hazardous weather, proximity to terrain, improved instrument approaches to small airports, and traffic information for the reduction of mid-air collisions. Additionally, Capstone provides improved surveillance information to controllers to assist in sequencing, separation, flight following, and search and rescue (SAR) activities. Capstone will also provide a more useable instrument flight rules (IFR) infrastructure to expand available lower en route and approach/departure routes.

Under Capstone, the Alaskan Region serves as a real-world demonstration of communications, navigation, and surveillance (CNS) technologies, procedures, and certification techniques. Capstone uses avionics and a ground infrastructure that have passed testing, certification, and operational approval for the safe introduction of systems into the existing Alaskan operational environment and the NAS. Capstone implements technology used by small aircraft, and focuses on operational benefits that can result from implementing avionics, ground systems, and operational procedures. Aircraft chosen to participate in the avionics validation are equipped with the following:

- An IFR-certified global positioning system (GPS) receiver for enhanced visual navigation capabilities; augmentation to receive wide area augmentation system (WAAS) signals as WAAS becomes available;
- A universal access transceiver (UAT) data link radio to provide the pilot with current decision-making information via ADS-B, traffic information service-broadcast (TIS-B), and flight information services broadcast (FIS-B);
- A panel-mounted, multiple function color display to present information from the above components, and to present a terrain advisory database (to include a terrain awareness and warning system (TAWS)) to help avoid collisions with terrain.

The major ground system components are as follows:

- Modification to the Anchorage Air Route Traffic Control Center (ARTCC) micro en route automated radar terminal system (MicroEARTS) automation system to incorporate ADS-B data for processing and display at the Anchorage ARTCC and Bethel Tower;
- Ground broadcast transceiver (GBT) remote ground stations with communication and router capability to the Anchorage ARTCC;
- Multilateration as a means to supplement ADS-B to provide information on transponder-equipped aircraft to controllers;
- FAA-certified automated weather observation systems (AWOS) model III with radio broadcast capability installed to enable air carrier use of the new non-precision GPS instrument approach procedures;
- Additional voice communications, as needed, to increase communications coverage to lower en route and approach/departure routes.

Increased safety benefits will result from:

- Supplying text and graphical weather to the pilot via data link;
- Increasing pilot situational awareness by providing cost-effective terrain and obstacle information;
- Improving low visibility terminal operations by installing AWOS facilities and designing GPS approaches in remote village airports;
- Providing traffic information to the cockpit using ADS-B, cockpit traffic displays, and TIS-B;
- Using an on-board traffic/navigation display and ADS-B to make needed flight path adjustments;
- Equipping vehicles in the airport movement area with ADS-B to increase pilot and vehicle operation situational awareness on the airport surface;
- Using ADS-B to provide additional surveillance coverage and fill gaps in current radar coverage;
- Integrating ADS-B data with radar and air traffic control automation systems to improve air traffic control capabilities.

(B) Safe Flight 21 – Ohio Valley Prototype Project

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve flight route flexibility and reduce delays through the use of ADS-B technology to achieve user-preferred routes and to maximize airspace and airport resources. ADS-B will serve as enabling technology for the free flight capability in the NAS.

In the oceanic, en route, and terminal environments, the increased flexibility and accessibility through the use of ADS-B technology will allow more aircraft to fly at their optimum altitude, speed, and routing, resulting in improved economic savings to the user. The evaluation of the Safe Flight 21 applications that support ADS-B and other related technologies will address arrival and departure capacity issues in all weather conditions, and provide enhanced surveillance and improved situational awareness for airspace users.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Improve aviation safety through the evaluation and validation of Safe Flight 21 applications in the oceanic, en route, terminal, and surface domains. Development of ADS-B and other related technology applications through rigorous testing, simulation, procedures validation, and analysis will result in enhanced situational awareness for air traffic controllers, dispatchers, pilots, and airport vehicle operators, and enhance overall system safety.

The use of ADS-B and other related technologies has significant potential for enhancing surveillance in air-to-air (A/A), air-to-ground (A/G), and ground-to-ground (G/G) operations. Safe Flight 21 applications will enhance the "see and be seen" flight and ground operations environment. The capability to use fast-update and highly accurate information and knowledge about aircraft and vehicle movements will significantly improve safety. Increased safety benefits can result from:

- Expanded and improved situational awareness for air traffic controllers, dispatchers, pilots, and airport vehicle operators in the oceanic, en route, terminal, and surface domains:
  - Improved flight crew situational awareness of other nearby aircraft and ground traffic;
  - Improved air traffic controller situational awareness by providing surveillance information in all airport surface operational areas and in non-radar airspace;
  - Improved management by dispatchers and vehicle operators for movement on the airport surfaces;
  - Enhanced safety functions in air traffic control automation systems through the use of more accurate and timely ADS-B capabilities.

(C) Automatic Dependent Surveillance Broadcast – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve aviation safety through the development of system standards for ADS-B technology in terminal, en route, and oceanic airspace, as well as on the airport surface. Development of domestic (RTCA) and International Civil Aviation Organization (ICAO) ADS-B performance standards through rigorous testing, simulation, and analysis will enhance surveillance for the pilots and controllers and overall system safety.

ADS-B technology has significant potential to enhance surveillance in A/A, airport surface, and A/G applications. ADS-B technological applications enhance the "see and be seen" flight and ground operations environment. The capability to use fast-update and highly accurate information and knowledge about aircraft and vehicle movements significantly improves safety. Increased safety benefits can result from:

- Expanded and improved situational awareness for air traffic controllers, dispatchers, pilots, and airport vehicle operators in the surface, terminal, and en route domains;
- Improved flight crew situational awareness of other nearby aircraft;
- Provided surveillance information in non-radar airport surfaces and in non-radar airspace;
- Improved visibility and situational awareness of aircraft and vehicles on airport surfaces;
- Enhanced safety functions in air traffic control (air traffic control) automation systems through the use of more accurate and timely ADS-B data.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Improved flight route flexibility and reduced delays through the use of ADS-B technology will help to achieve user-preferred routes and maximize airspace and airport resources. ADS-B will serve as enabling technology for free flight capabilities in the NAS. Development of ADS-B standards will permit more flexible flight routes and international harmonization of ADS-B capabilities.

In the oceanic, en route, and terminal environments, increased flexibility and accessibility through the use of ADS-B technology will allow more aircraft to fly at their optimum altitude, speed, and routing, resulting in improved economic savings to the user. ADS-B technological applications will also support all-weather operations in the air and on the ground. At airports, arrival and departure capacity decreases with inclement weather conditions. Airport capacity may be increased through the use of enhanced surveillance and improved situational awareness.

Category 1: 1C01 Advanced Technology Development and Prototyping

- **A) Separation Standards – Advanced Technology Development and Prototyping**
- **B) Runway Incursion Reduction – Advanced Technology Development and Prototyping**
- **C) System Capacity, Planning, and Improvements – Advanced Technology Development and Prototyping**
- **D) Operations Concept Validation – Advanced Technology Development and Prototyping**
- **E) Software Engineering Resource Center – Advanced Technology Development and Prototyping**
- **F) Wide Area Augmentation System for Global Positioning System – Advanced Technology Development and Prototyping**
- **G) Local Area Augmentation System for Global Positioning System – Advanced Technology Development and Prototyping**
- **H) Airspace Management Laboratory – Advanced Technology Development and Prototyping**
- **I) National Airspace System Requirements Development – Advanced Technology Development and Prototyping**
- **J) General Aviation/Vertical Flight Technology – Advanced Technology Development and Prototyping**
- **K) Domestic Reduced Vertical Separation Minima – Advanced Technology Development and Prototyping**

(A) Separation Standards – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve oceanic system efficiency while maintaining agreed level of safety through introduction of reduced separation standard values in portions of international airspace where the FAA is partly responsible for the provision of Air Traffic Services (ATS) under delegation from the ICAO. The increase in efficiency comes about as the result of making additional economically attractive routes and flight levels available to airspace users. A by-product of the increase in oceanic system efficiency is a relief of the airport-congestion burden that is traceable to a higher percentage of flights cleared for on-time departures.

This program will improve oceanic system efficiency through introduction of reduced separation standard values in horizontal and vertical planes. Reduced separation standard values permit more aircraft to operate on fuel- and time-optimal routings during oceanic phases of flight. Increased system capacity following from the introduction of reduced separation standard values—as measured by availability of more fuel- and time-efficient routings—reduces delays of oceanic flights at origin airports because increased system capacity allows more on-time departures.

(B) Runway Incursion Reduction Program – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Reduce the number and rate of runway incursions and improve surface safety at NAS airports through research, development, demonstration, and evaluation of new and emerging methods, procedures, and technologies.

New and emerging technologies have significant potential for enhancing situational awareness on the airport surface. These technologies will enhance the "see and be seen" ground operations environment. The capability to use these technologies to enhance situational awareness related to aircraft and vehicle movement on the airport surface will significantly improve safety. Increased safety benefits can result from:

- Expanded and improved surface situational awareness for air traffic controllers, pilots, and airport vehicle operators;
- Surveillance information available in all airport surface operational areas;
- A second line of defense against runway incursions (when technologies are fully implemented).

(C) System Capacity, Planning, and Improvements – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide an aerospace transportation system that meets users' needs and efficiently governs the increasing level of air traffic by reducing system delays and the time necessary to develop operational criteria and procedures, and significantly reduces implementation risks for the NAS Architecture.

Develop, track, and report on ATS performance measures; provide direction and management support to initiatives that increase airport safety, capacity, and efficiency; and serve as a liaison between the FAA and the industry on capacity issues**.**

The events of September 11, 2001, resulted in major shifts in the way the NAS is operated and maintained as well as a new emphasis for the planning and implementing near-term and long-term needs. While safety and security have always been primary considerations, the heretofore problem of congestion and efficiency must now be considered in a new light. All venues of public transportation require increased resources to deal with the threat of terrorism. The NAS is now the main area of concern. Reduced air travel has placed many airlines and airports in jeopardy of collapse. The loss of jobs and revenues across many industries are part of the non-human tragedy.

Economic recovery is more than ever a national priority. As now seen, the impact of temporary loss of the U.S.'s ability to maintain a safe, secure, and efficient NAS was felt worldwide. Improvements in safety and security must be supported by investments in returning the NAS to normal capacity, which means that each dollar invested in supporting the recovery from a capacity perspective must also show how security and safety are also enabled. Ongoing and planned capacity initiatives and activities must be re-evaluated in terms of timing and implications to today's environment.

Beginning in FY 2002, each element of the aviation System Capacity, Planning, and Improvement Program was re-evaluated to reflect current relative value and risks, given recent developments. The Office of System Capacity (ASC) continues to provide analysis necessary to develop an overall strategy to enhance system capacity. This analysis includes both terminal and en route assessments of procedures and capacity related technologies to develop customized solutions for airports and customers. It also includes a performance measurement system for measuring the benefits and cost of airport, airspace, and procedure solutions. This strategy combines program and project performance results with cost accounting information to improve investment decision-making, thereby achieving optimal strategic and operational outcomes. A new airport efficiency metric developed from ASC analysis will

support the Operational Evolution Plan (OEP), Government Performance & Results Act (GPRA), and other performance indicators of national importance.

(D) Operations Concept Validation – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide well-defined and well-understood "validated" operational concepts to support the development of the NAS transition steps in the NAS Architecture. Provide integrated guidance to the aviation community for the development and transition to a modernized NAS, including system specification, roles and responsibilities, procedures, training, and certification requirements.

The operational concept development and validation activities provide for the continued development and support of modernization through:

- Concept development
- Lower level concept development
- Scenario development of operational changes to support the establishment of system level requirements
- Concept validation
- Analysis tools development to evaluate impact of proposed concepts
- Fast-time simulation and analysis
- Validation data repository
- System design
- Metrics development
- Information modeling to support scenario-to-requirements translation

These activities provide the basis upon which the NAS Architecture establishes validated, integrated, configuration-managed requirements for the subsystems of the new target system, providing a coherent, comprehensive framework to guide the associated research and development (R&D) activities (e.g., specific requirements for ADS-B capabilities, surface management capabilities, advanced concept probe, etc.). They also support top-level designs for the major new Air Traffic Management (ATM) capabilities and subsystems associated with the operational concept (e.g., the ground-based and airborne information infrastructures required for modernization and the design of a capability to dynamically tailor an air traffic controller's airspace responsibility to more efficiently accommodate traffic demand).

(E) Software Engineering Resource Center – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Address a U.S. Senate recommendation to "conduct an in-depth analysis of the processes within the FAA which are affected by commercial-off-the-shelf (COTS)/non-developmental item (NDI) technologies, identify new methods to test and validate safety-critical systems that are not dependent on source code analysis, [and] investigate ways to reduce cost and time to establish high confidence in a system." Congress, the Government Accounting Office (GAO), and the Research, Engineering, and Development (RE&D) Advisory Committee have routinely criticized the FAA for its shortcomings in the definition, acquisition, and maintenance of software-intensive systems. These deficiencies have resulted in increased cost, decreased quality, and delayed deployment of software-based capabilities. Because all the systems required to modernize the NAS are dependent on software, the FAA must improve its software engineering capabilities to meet operational objectives.

By improving the process for the acquisition of software intensive systems integrated with COTS/NDI products, higher quality systems will be fielded and operational within the projected schedule and allocated budget. By streamlining the procedures for certifying avionics and ground-based safety-critical software, new aviation system products can be developed faster and cheaper. By modernizing the way the FAA collects, stores, distributes, and manages aeronautical and adaptation data, the FAA can improve access to the data and ensure its safety and quality, reduce costs through standardized data and procedures, and facilitate data and domain analysis.

The primary mission of the FAA's Software Engineering Resource Center (SERC) is to optimize systems and software engineering practices to design, acquire, develop, and maintain high quality, mission critical systems. The SERC continues to work toward the implementation of an agency-wide adaptation data management program that includes data standardization and supports IT security, enterprise-wide network operations, secure electronic data exchange, and electronic signature capabilities. The SERC evaluates and validates improved software processes, methods, and engineering tools that enhance architecture, systems and software engineering, testing, and certification functions over the life cycle of systems in the NAS. The SERC brings together recognized experts and FAA personnel to solve problems related to the certification of software, COTS/NDI, and next generation architecture. This coordination transfers skills and increases the technical competency of the FAA workforce.

(F) Wide Area Augmentation System for Global Positioning System – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
See 3A01B

(G) Local Area Augmentation System for Global Positioning System – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
See 3A01A

(H) Airspace Management Laboratory – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve the efficiency of the NAS by providing the data, metrics, and tools to analyze traffic and airspace configuration to optimize traffic flows through sector design and analysis using historical and projected traffic loads.

The Airspace Management Laboratory will increase the efficiency of the NAS by collecting traffic information from the enhanced traffic management system (ETMS) and local facility data points to construct historical traffic and system loading metrics. Traffic specialists and analysts will use this data to analyze, design, and benchmark existing and proposed airspace structures in the en route and terminal areas. The primary tool used by the FAA to perform this function is the sector design and analysis tool (SDAT).

The initial conversion of this legacy application will begin deployment in FY 2002. Further enhancements and support will be made in FY 2003 and beyond to facilitate the FAA's ability to develop and analyze GPS routes for an entire TRACON area and connectivity to en route centers.

In addition, the Airspace Management Laboratory will continue the deployment and enhancement of the FAA's obstruction evaluation system. This system is essential to provide data to analysis services, tools, and systems

required to support the development of GPS routes. The deployment of this system will merge multiple databases and processes into a centralized national system. This application is the FAA's mechanism for management of workflow, data, and correspondence required to verify that proposed construction does not present a safety hazard to aviation.

Although not the primary purpose, the above data and tools are used to support analysis of security vulnerabilities and impacts.

Secondary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Secondary Outcome Goal:
Improve the FAA's ability to develop routes and procedures to minimize the number of people exposed to aircraft noise.

The Airspace Management Laboratory is responsible for the development of the noise integrated routing system (NIRS). This FAA-owned tool provides the ability to analyze multi-terminal airspace. NIRS allows the analyst to decompose the noise profiles to determine the traffic sample's profile contribution and alternatives. As National Airspace Redesign and the OEP develop alternatives to enhance terminal capacity, NIRS provides the detailing mechanism for that analysis.

(I) National Airspace System Requirements Development – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Contribute to the system efficiency goal by providing research and evaluation for the purpose of identifying new and existing technologies that will meet the identified needs of aerospace users. Provide funding for independent investigation of technologies and selected programs to transition from existing to new user needs. Such investigations assist in determining and selecting only those programs or technologies best suited to advance overall NAS system efficiency.

(J) General Aviation/Vertical Flight Technology – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Reduce the GA accident rate by integrating new CNS technology, improved avionics, and aircraft performance capability along with airman training requirements to enable a greater number of GA and vertical flight (VF) aircraft to receive IFR services and to enable visual flight rules (VFR) aircraft to navigate with a higher level of precision and awareness of the proximity of other aircraft and obstacles.

The GPS WAAS and Low Area Augmentation System (LAAS) Programs, dependent surveillance programs, Safe Flight 21, the Safer Skies initiative, and National Aeronautics and Space Administration (NASA) efforts are developing and testing new technologies and procedures to improve the safety and efficiency in the NAS. The GA/VF Program integrates the results of these programs and the knowledge of improved aircraft and avionics performance characteristics to facilitate the development and implementation of new airspace and heliport design criteria, operating procedures, and airmen information and training requirements. These new criteria and procedures are primarily directed at GA/VF operations in terminal and low altitude airspace, which are areas with a high probability of accidence risk.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Improve route flexibility and reduce delays by using improved CNS systems to enable GA/VF operations in airspace where navigation and air traffic control service is impeded because of current system performance and to enable aircraft to navigate flight paths independent of air carriers and other high performance aircraft routes in terminal and en route airspace.

The GPS WAAS and LAAS Programs, dependent surveillance program, and NASA efforts are developing technology that will enable GA/VF aircraft to navigate precisely on reduced width routes and receive air traffic control services at altitudes below those currently available. This will permit greater flexibility in aircraft routing in low altitude airspace and may also enable simultaneous non-interfering operations between high performance and vertical flight aircraft in terminal areas and at major airports. Providing independent fixed wing and vertical flight operations will enable additional operations of high performance aircraft at congested airports.

(K) Domestic Reduced Vertical Separation Minima – Advanced Technology Development and Prototyping

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Enhance en route traffic throughput by providing six additional altitudes between flight level (FL) 290-410, resulting in aircraft fuel burn reduction of one percent, saving an estimated $400 million annually for NAS users. Provide controller greater flexibility and enhance the efficiency of the NAS.

Category 1: 1C02 Aircraft Related Equipment Program
- **(A) Aircraft Related Equipment Program**
- **(B) Aircraft Related Equipment Program – Simulator Replacement**

(A) Aircraft Related Equipment Program

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve air safety by ensuring that (1) flight inspection aircraft/systems are equipped/modified to validate/certify the accuracy of navigational aids' electronic signals and validate/certify the flyability of approach/departure flight at all airports in the NAS; (2) R&D aircraft are equipped to test/evaluate new aviation technologies for proof of concept, systems integration, equipment, procedures, and related human factors impacts; and (3) support flight/training mission aircraft are equipped to provide meaningful and relevant ASI pilot currency/proficiency experience and training required for ASIs to regulate/certify all pilot instructors and test pilots and validate/certify all NAS commercial and civil aircraft operations. Each of these flight program missions serves to reduce fatal aviation accident rates through the investigation and incorporation of accident prevention techniques, safety information sharing/analysis, and certification/surveillance via in-flight inspection, testing, evaluation, and validation of activities directly serving safety initiatives benefiting all air carrier and GA users of the NAS.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Improve system efficiency by ensuring agency aircraft/systems are equipped/modified to support required in-flight activities associated with new technologies emerging from and advocated by the NAS Architecture, OEP, and the Commercial Air Safety Team (CAST) Plan recommendations. Increased traffic volumes will be accommodated through expanded flight route flexibility afforded by satellite-based navigation capabilities and associated increases

in certified approach/departure flight procedures designed for runways where land-based systems, infrastructure, or terrain prohibited them previously. By validating parameters for reduced en route traffic separation and aircraft-to-obstacle separation, the enhanced flight inspection capabilities will help relieve air traffic choke points by multiplying traffic flow rates to and from airports and providing increased all weather access to airports via precise navigation instrument approach/departure procedures that ensure similarly equipped aircraft can fly consistent and repeatable paths safely and expeditiously.

(B) Aircraft Related Equipment Program – Simulator Replacement

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve air safety by performing meaningful and relevant R&D operational evaluations for large transport category aircraft representative of the U.S. air carrier industry through the acquisition of an advanced technology flight simulator. Also provide the capability for ASI pilot training and currency/proficiency experience required in the regulation/certification of all activities comprising U.S. aircraft operations.

This program ensures flight safety by providing the capability to conduct meaningful and relevant R&D operational evaluations of latest aviation technologies, equipment, and procedures utilizing flight simulation when use of aircraft is too risky, too costly, or otherwise impractical. Data gathered from flight simulation activities are incorporated for consideration to assist subsequent in-flight R&D testing and evaluation activities for the OEP, runway incursion reduction, land and hold short procedures, free flight initiatives, and other critical safety issues. The simulator also provides the FAA's ASI pilots a vehicle to achieve currency/proficiency experience, and pilot/aircrew training critical to execution of all regulatory/certification activities associated with the U.S. air carrier industry. Simulator flight deck avionics are required to be technologically representative of the current and future U.S. large transport category aircraft population.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Ensure NAS efficiency by performing R&D operational evaluations prior to actual in-flight testing and field deployment using aircraft to support/incorporate NAS Modernization initiatives/issues. Examples include validation and certification of (1) land and hold short operations procedures; (2) airport and airways capacity expansion techniques; (3) free flight initiatives; (4) new aviation systems' operations/integration; (5) human factors impacts on pilots/flight crews from new technology equipment, systems integration, and procedures; (6) proof of concept verification of proposed new technology systems/procedures; and (7) all aviation regulatory activities for all U. S. aircraft operations.

Category 1: 1C03 National Aviation Safety Data Analysis Center
National Aviation Safety Data Analysis Center

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Maximize the potential for data analysis to reduce or prevent fatal commercial accidents by simplifying complicated and difficult data access problems, strengthening questionable data integrity, enabling automated analysis to be performed on an integrated basis across multiple bases, creating integrated data sets, distributing quality data to the FAA and the broader aviation community, and acquiring and sharing analytical tools for identification and analysis of precursors to aviation accidents.

Category 1: 1C04 Explosive Detection Technology
Explosive Detection Technology

Primary Outcome Goal: FAA Goal: National Security: Prevent security incidents in the aviation system.

Narrative for Primary Outcome Goal:
Achieve 100 percent screening of selected checked baggage by certified explosives detection systems, eliminating equivalent technologies and procedures at airports.

Category 2

Definition of Category 2: Improve Efficiency of the Air Traffic Control System

This category contains related programs and projects that improve the systemic utilization of the of the en route airspace structure.

FAA Goal: System Efficiency: *Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.*

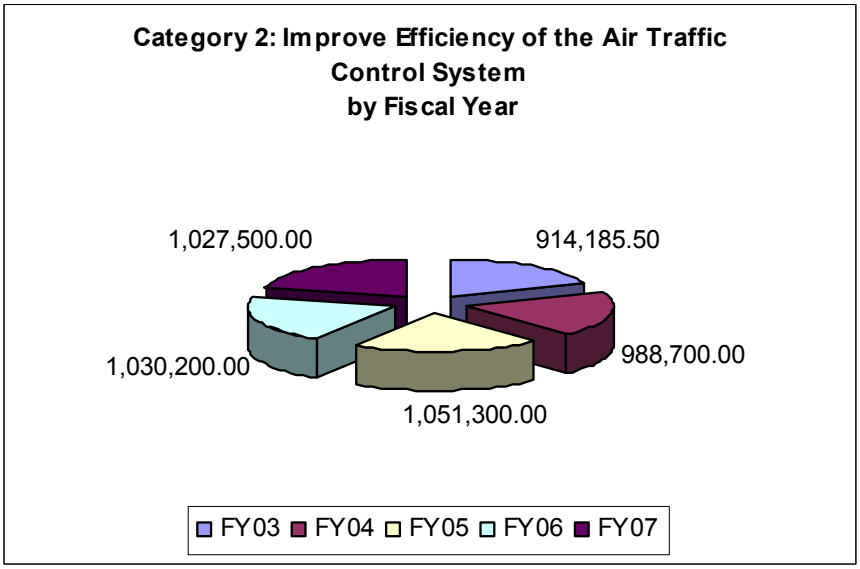
Strategies to Achieve FAA Goals:

Free Flight: *Within safety and environmental considerations, work toward giving aircraft the opportunity to fly in a way that gives them the most benefit as they define it.*
NAS Modernization: *Using the NAS Architecture as the guideline, continually refine and update the NAS to achieve efficient aerospace systems and operations.*
Systems Integration: *Integrate airport and commercial space requirements into NAS planning and architecture.*

FAA Annual Performance Goals:

Aviation Delays – *Reduce aviation delays to no more than 171 per 100,000 activities.*
All Weather Access to Airports – *Increase the number of runways that are accessible in low visibility conditions. FY 2003 goal is at least 1,624 runways.*

The following graph indicates distribution of funding for F&E programs in Category 2: Improve Efficiency of the Air Traffic Control System for FY 2003 to 2007. Funding in thousands.



Category 2: 2A01 Terminal Business Unit: 2A01A Terminal Automation Program

- **Standard Terminal Automation Replacement System – Development & Procurement**
- **Standard Terminal Automation Replacement System – Technology Refresh**
- **Terminal Sustain**
- **Interim Tower Displays**
- **Standard Terminal Automation Replacement System – Automated Radar Terminal System Model IIIE/Automated Radar Terminal System**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide a digital capable system to meet expanding air traffic control needs. The standard terminal automation replacement system (STARS) will provide new computer workstations with high-resolution color displays and commercially-based software to allow the FAA to move toward uniform configuration at all terminal facilities. The terminal automation evolves from an infrastructure composed of various FAA and Department of Defense (DoD) automation systems (e.g., ARTS IIIA, ARTS IIE, ARTS IIIE etc) and associated displays to the STARS.

STARS requires digitized radar data from surveillance systems to process tracking. It will provide multiple radar sensor tracking and mosaic displays. Initially, STARS will provide new color displays using the ARTS backroom equipment. The STARS workstation will display air traffic, weather overlay, and traffic flow management (TFM) information for controllers. STARS can be easily upgraded and will support current and future surveillance technology, traffic and weather information, and sequencing and spacing tools. Future upgrades to STARS tower displays will add a capability to display airport surface traffic and runway incursion alerts in addition to providing an interface for terminal controller-pilot data link communications (CPDLC).

Category 2: 2A01 Terminal Business Unit: 2A01B Air Traffic Control Beacon Interrogator – Replacement
Secondary Surveillance – Air Traffic Control Beacon Interrogator – Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Reduce the cost growth associated with maintaining older beacon interrogator equipment. This program will ensure that aircraft positional information and identification remain available to support air traffic control services, including separation assurance, traffic management, navigation, and flight information.

Air traffic control beacon interrogator (ATCBI) model 6 replaces existing surveillance ATCBI-4/5 equipment that has reached the end of its life cycle. ATCBI-6 selectively interrogates individual aircraft and provides precise tracking information to the host system. This improved automation tool is designed to support free flight.

The ATCBI-6 Replacement Program will procure 127 monopulse secondary surveillance radar (MSSR) with selective interrogation to replace existing operational beacons, including three support systems for training, testing, logistics, and operational support. This approach will meet the near-term needs while providing a seamless transition for the FAA's use of GPS-based technology.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Continue to provide the position and identification of aircraft to air traffic control so that aircraft can be separated, the airspace can be managed, and the controller/pilot can maintain airspace awareness.

Category 2: 2A01 Terminal Business Unit: 2A01C Air Traffic Control En Route Radar Facilities Improvements

Long-Range Radar Program – Long-Range Radar Improvements – Infrastructure Upgrades

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency of the NAS by ensuring that aircraft positional information and identification derived from long-range radar (LRR) sites remains available to support air traffic control services, including separation assurance, traffic management, navigation, and flight information.

The planned modifications will improve safety, reduce operating costs, and provide greater efficiency in en route air traffic control and facility maintenance operations by refurbishing en route equipment and facilities. F&E upgrades, particularly the antenna drive system and environmental improvements, are required at nearly all of the 126 en route LRR facilities before the FAA can deploy replacement secondary surveillance radar (SSR) or transition to an en route beacon-only environment. Without these upgrades, operational problems occur each year that have severe and immediate impacts on air traffic control. These radar problems require quick, responsive engineering analysis and systems corrections to ensure the safety of the en route surveillance area.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Ensure that even in a variety of physical site environments (e.g., temperature, commercial power, and lightning) that the position and identification of aircraft is reliably supplied to air traffic control so that aircraft can be separated, the airspace can be managed, and the controller/pilot can maintain airspace awareness.

Facility upgrades will ensure efficient and safe environments to house primary and secondary radar. Heating, air conditioning, electrical, and all Occupational Safety and Health Administration (OSHA) requirement upgrades allow optimal physical site environments for effective air traffic system utilization.

Category 2: 2A01 Terminal Business Unit: 2A01D Terminal Air Traffic Control Facilities – Replace

Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Air Traffic Control Tower/Terminal Radar Approach Control Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency and availability of service in the NAS by replacing existing ATCTs and TRACONs that cannot meet the needs of present day airport operational requirements. The average age of control towers is 27 years and some are as old as 40 years. As the volume and complexity of terminal air traffic control increases so does the need to have additional positions in the ATCT/TRACON. The FAA provides air traffic control services from over 270 ATCT/TRACON facilities and must continually replace these buildings to meet demands.

Category 2: 2A01 Terminal Business Unit: 2A01E Air Traffic Control Tower/Terminal Radar Approach Control Facilities – Improve

- **(A) Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Air Traffic Control Tower/Terminal Radar Approach Control Modernization**
- **(B) Large Terminal Radar Approach Controls – Advanced Facility Planning**
- **(C) Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Standard Terminal Automation Replacement System Facility Upgrades**

(A) Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Air Traffic Control Tower/Terminal Radar Approach Control Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency and availability of service in the NAS by modernizing and improving terminal facilities to meet current and future operational requirements.

(B) Large Terminal Radar Approach Controls – Advanced Facility Planning

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by conducting studies to identify operational needs and opportunities to consolidate air traffic control facilities.

(C) Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Standard Terminal Automation Replacement System Facility Upgrades

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by completing facility upgrades that are required to provide a stable platform for the deployment of STARS.

Category 2: 2A01 Terminal Business Unit: 2A01F Potomac Terminal Radar Approach Control
Large Terminal Radar Approach Controls – Potomac Terminal Radar Approach Control

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative of Primary Outcome Goal:
Improve system efficiency through the consolidation of the TRACON facilities serving the Washington-Baltimore Metropolitan and outlying areas and redesign of the associated airspace.

Category 2: 2A01 Terminal Business Unit: 2A01G Northern California Terminal Radar Approach Control
Large Terminal Radar Approach Controls – Northern California Terminal Radar Approach Control

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Support system efficiency and effectiveness by combining four TRACONs (Bay, Sacramento, Stockton, and Monterey) into one facility (i.e., Northern California TRACON (NCT) in Sacramento, CA) by upgrading and improving equipment to provide costs savings to the agency, and by optimizing the use of the airspace.

Category 2: 2A01 Terminal Business Unit: 2A01H Dallas/Fort Worth Terminal Radar Approach Control
Large Terminal Radar Approach Control – Dallas/Fort Worth Terminal Radar Approach Control

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Funding in FY 2003 closes out this project.

Category 2: 2A01 Terminal Business Unit: 2A01I Terminal Digital Radar (Airport Surveillance Radar Model 11)

- **Airport Surveillance Radar Model 11 – Airport Surveillance Radar Model 7/Airport Surveillance Radar Model 8 Replacement, Department of Defense Takeover, New Establishments**
- **Airport Surveillance Radar Model 11 – Technology Refresh**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency and availability of service in the NAS by replacing existing ASR-7/8 systems and associated ATCBI 4/5. Replacement of existing systems with new digital ASR-11 radar systems will ensure continuation of surveillance service with improved and expanded 6-level weather detection/display capability. New digital ASR-11 systems will also provide the input required for STARS and eliminate the need and cost to re-engineer/replace obsolete parts required to sustain existing ASR-7/8 systems.

Category 2: 2A01 Terminal Business Unit: 2A01J Airport Surveillance Radar (Airport Surveillance Radar Model 9)

- **Terminal Radar Program – Airport Surveillance Radar Model 9**
- **Terminal Radar Program – Airport Surveillance Radar Model 9 Service Life Extension Program**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Provide digital terminal surveillance coverage, plus six-level weather, at 135 high activity airports and support facilities. Terminal radar of these critical systems through 2020 reduces delays and improves safety at congested airports. A SLEP is needed to ensure continued operation

The ASR-9 SLEP will improve reliability and performance levels, adding to increased safety. Recent failures at ASR-9 sites have indicated the criticality of extending the service life of the ASR-9

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Provide controllers information that permits closer aircraft operations and greater traffic volume during instrument meteorological conditions. Scheduled and unscheduled radar system outages, increased system availability, and air traffic control system delays are attributable to surveillance problems. Extending the service life of the ASR-9 system reduces the risk of outages due to deterioration and parts obsolescence and ensures the continuation of maximum service capabilities during poor visibility, nighttime, and adverse local weather conditions

The ASR-9 system continues to experience overall deterioration and parts obsolescence. Reliability and performance levels suffer, and these factors adversely impact capacity. The SLEP alleviates these concerns by making the system easier to maintain and more reliable than the present system.

Category 2: 2A01 Terminal Business Unit: 2A01K Mode-Select – Provide

- **Secondary Surveillance – Mode-Select**
- **Secondary Surveillance – Mode-Select – Service Life Extension Program**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS through the commissioning of 144 mode-select (Mode-S) systems. These systems will make traffic information service (TIS) available to those who desire to equip their aircraft (e.g., Cargo Airline Association members); reduce the number of false targets presented to air traffic controllers; and support safety. Commissioned Mode-S systems will reduce the maintenance workload requirements imposed by older, less efficient systems.

Replacement of obsolescence and procurement of spares will provide substantial performance and safety improvements and will improve supportability.

With the current and ongoing concerns regarding air traffic delays, near-term replacement and redesign of Mode-S critical components is a high priority and will result in improved NAS efficiency. Replacement and/or redesign of Mode-S critical components will provide near-term benefits and improvements in reliability and supportability, mitigating air traffic delays.

Category 2: 2A01 Terminal Business Unit: 2A01L Terminal Applied Engineering
Air Traffic Control Tower/Terminal Radar Approach Control Establish/Sustain/Replace – Terminal Applied Engineering

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by providing engineering and analysis efforts. The Terminal Applied Engineering Program streamlines the deployment of FAA resources to conduct facility surveys, and provides a benchmark for future terminal facility planning across all terminal programs.

Category 2: 2A01 Terminal Business Unit: 2A01M Precision Runway Monitors
Precision Runway Monitor

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Allow simultaneous independent approach on runways closer than 4,300 feet by utilizing one-second update radar. Return a portion of lost capacity during adverse weather conditions and thus reduce associated delays.

The precision runway monitor (PRM) system is a highly accurate electronic scan radar that tracks and processes aircraft targets once per second (as opposed to 4.8 seconds with conventional radar). Five production systems and associated site and depot spares have been manufactured and procured by the FAA. Two PRM systems, Minneapolis and St. Louis, have been installed and commissioned. Installation activities are underway at John F. Kennedy International Airport, and the Philadelphia International Airport was commissioned in September 2001.

Category 2: 2A01 Terminal Business Unit: 2A01N Houston Area Air Traffic System
Large Terminal Radar Approach Controls – Houston Area Air Traffic System

Primary Outcome Goal: FAA Goal: Increase capacity with addition of two new runways at the George Bush Intercontinental Airport

Narrative for Primary Outcome Goal:
This project expands navigation aids in the Houston metropolitan area and increases air traffic control services and facilities to handle new runways at Houston.

Category 2: 2A02 Aeronautical Data Link Applications
- **(A) Aeronautical Data Link – Flight Information Service**
- **(B) Aeronautical Data Link – Controller Pilot Data Link Communications Build I/IA**
- **(C) Aeronautical Data Link – Tower Data Link Services**

(A) Aeronautical Data Link – Flight Information Service

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve the safety of the NAS by providing new weather hazard graphics directly to pilots via data link for cockpit display relative to current position and route of flight, and by improving the quality of aviation weather hazard advisories through input of aircraft derived weather data from commuter and low-altitude GA operations.

The Flight Information Service (FIS) Program will increase the level of safety in the NAS through implementation of flight information services data link (FISDL) systems that provide data link broadcasts of graphic and text FIS/weather products to the cockpit. This timely access to FISDL weather data provides better information to pilots, allowing pilots to make earlier decisions to continue or divert a flight, which leads to improved and safer flight operations. Weather is a major factor in GA accidents. FISDL implementation will support the FAA safety goal of reducing fatal accidents by 2007 by an amount that results in a 20 percent improvement from the projected total for that year. FISDL is an FAA sponsored service implemented through FAA/industry agreements established in 1999. The FAA is providing access to the aeronautical spectrum and two industry service providers are providing the necessary data processing and communications infrastructure. FISDL is a very high frequency (VHF) broadcast service.

In addition, the FIS Program will determine the feasibility of establishing a national system for collecting and disseminating weather reports from commuter and low altitude general aviation operations. These automated

meteorological (AUTOMET) reports will provide coverage over data void regions and are essential for input to the NWS aviation forecast models and for improved predictions of severe convective weather conditions that impact the NAS.

This program is dependent on industry installation of the FISDL ground infrastructure and aircraft equipage for FISDL service.

(B) Aeronautical Data Link – Controller Pilot Data Link Communications Build I/IA

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Combine reduced voice communications workload and distribute communications responsibility to provide benefits by increasing flight efficiency, which is reflected by less time and fewer miles flown in sector, as well as increased airspace capacity, which is reflected by increased sector traffic throughput (miles in trail restrictions relaxed in an experimental sector based on voice communication reduction) and reduced delay.

The en route CPDLC Program supports the exchange of air traffic control information between FAA controllers and pilots using digital data link applications and technology based on the ICAO standards.

CPDLC Build I will provide early operational use and experience with recurring, routine, and repetitive controller-pilot messages in en route airspace by implementing a subset of ICAO, Aeronautical Telecommunication Network (ATN), standards and recommended practices (SARP), and the CPDLC message set. CPDLC Build I will implement the messages/services required to perform the transfer of communications, initial contact, altimeter setting, and pre-defined free text messages. These messages will be sent to data link equipped aircraft using a service provider's VHF digital link (VDL) mode 2 A/G communications subnetwork. VDL Mode 2 is an evolutionary step satisfying performance and reliability requirements for situations in which the message is not time-critical. CPDLC Build I will only be implemented at a key site (Miami ARTCC).

CPDLC Build IA will leverage the FAA's investment in the development of CPDLC Build I. CPDLC Build IA will increase the ATN compliant CPDLC message set to accommodate assignment of speeds, headings, and altitudes as well as a route clearance function. A capability to handle pilot-initiated altitude requests will also be implemented.

(C) Aeronautical Data Link – Tower Data Link Services

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve the efficiency of the NAS by replacing aging, obsolete systems and software. Transition all maintenance from contractor furnished to FAA (organic).

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Enhance safety by decreasing communication errors and increasing communications accuracy.

Category 2: 2A03 Free Flight Phase 2

(A) Free Flight Phase 2 – Integration
(B) Free Flight Phase 2 – User Request Evaluation Tool
(C) Free Flight Phase 2 – Traffic Management Advisor-Single Center
(D) Free Flight Phase 2 – Collaborative-Decision Making
(E) Free Flight Phase 2 – Priority Research Support Efforts

(A) Free Flight Phase 2 – Integration

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by supporting the initial daily use (IDU)/planned capability available activities for the Free Flight Phase 2 tools/capabilities.

Resolve cross product Free Flight Phase 2 issues to include, but not limited to, program controls, performance metrics, risk management, human factors, benefits assessment, systems engineering, operational integration, and airspace analysis in preparation for site implementation.

(B) Free Flight Phase 2 – User Request Evaluation Tool

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal
Provide a tool that identifies conflicts in requested flight paths and allows air traffic controllers to evaluate pilot requests. The user request evaluation tool (URET) contributes to the system efficiency goal by increasing direct routings by 15 percent.

(C) Free Flight Phase 2 – Traffic Management Advisor-Single Center

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Contribute to an increased capacity at selected airports by three percent.

The Center TRACON Automation System (CTAS) En Route Program provides traffic management coordinators with a tool to create metering plans and provides individual controllers with information on the required delays for each aircraft.

(D) Free Flight Phase 2 – Collaborative Decision-Making

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Bring together major users of the NAS in order to employ tools to ease congestion, reduce delays, and promote efficiency by three percent at selected airports.

(E) Free Flight Phase 2 – Priority Research Support Efforts

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Develop new tools, which are RTCA recommended, that yield user benefits within the 2003-2005 timeframe. These include direct-to problem analysis, resolution, and ranking (PARR), traffic management advisor (TMA)–multi center (TMA-MC), and surface management system (SMS). There are other research projects, but they will not mature sufficiently to produce user benefits during this time. The products that are under development are advanced vortex spacing system (AVOSS), active final approach spacing tool (aFAST), en route descent advisor (E/DA), and expedite departure path (EDP).

Category 2: 2A04 Air Traffic Management
Air Traffic Management – Traffic Flow Management Infrastructure – Current Enhanced Traffic Management System Operations

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by utilizing national-scale traffic management. Sustain and upgrade mission essential TFM operations mandated Congressionally to handle the expected increase in air traffic and TFM message traffic that will be generated by full implementation of new delay reduction initiatives and free flight.

Improve system efficiency by maintaining and upgrading the existing TFM infrastructure to continue mission essential TFM operations in over 80 air traffic control facilities.

Category 2: 2A05 Free Flight Phase 1
Free Flight Phase 1 – Sustain

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by continuing to derive capacity gains realized from Free Flight Phase 1 systems. Within safety and environmental considerations, work toward giving aircraft the opportunity to fly in a way that gives them the most benefit as they define it.

Category 2: 2A06 Automated Surface Observing System
- **Automated Surface Observing System – Base Systems**
- **Automated Surface Observing System – Pre-Planned Product Improvements**
- **Automated Surface Observing System – Data Displays**
- **Automated Surface Observing System – Standalone Weather Systems**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Support system efficiency by automating surface weather observations to meet the needs of pilots, operators, and air traffic personnel. The aviation surface weather observation network (ASWON) includes the AWOS, ASOS,

automated weather sensors systems (AWSS), stand-alone weather sensors (SAWS), and ASOS controller equipment information display system (ACE-IDS or Data Displays).

The FAA has developed a long-range equipment strategy for improving automated surface weather observations. The ASOS provides air traffic controllers with critical weather parameters that are vital for continued operation of aircraft landings and take-offs, which thereby reduces delays. AWSSs provide pilots and other users with minute-by-minute weather updates. The SAWS provides wind, temperature, and dew point information as a backup for ASOS at Service Level C sites. ACE-IDS presents required weather and other operational information in the tower and TRACON via a local area network (LAN) or a wide area network (WAN). The primary purpose of ASWON is to support the FAA and NWS modernization by automating the surface weather observation to meet the needs of pilots, operators, and air traffic personnel without incurring the high costs of labor-intensive manual surface weather observations. In a joint program with NWS, the ASWON Program procured 569 ASOSs from 1991 through 1997; 31 AWSSs in FY 1998; and 270 SAWS and 17 ACE-IDS systems through FY 2001. These systems will be deployed through the year 2006.

Category 2: 2B01 Next Generation Very High Frequency Air-to-Ground Communications System

- **Next Generation Air-to-Ground Communications System – Segment 1a**
- **Next Generation Air-to-Ground Communications System – Segment 1b**
- **Next Generation Air-to-Ground Communications System – Segments 2/3**
- **Ultra High Frequency Radio Replacement**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Enhance operational efficiency and effectiveness by addressing the need for new digital A/G radios (to replace aging analog radios) and other necessary equipment to provide an end-to-end A/G communications capability to a system that lacks the capacity to meet current and near-term air traffic control communication demands. Specific needs include the following:

- Provide air traffic controllers the capability to accommodate the growing number of sectors and services using the limited spectrum available in the VHF aeronautical frequency band;
- Reduce logistical costs (supplies, maintenance, training, etc.) to maintain VHF and ultra high frequency (UHF) radios that have exceeded their life expectancy by 10 years;
- Procure UHF transmitters and receivers to support the DoD. The UHF radios will be deployed simultaneously with the next generation A/G communications (NEXCOM) segment 1a multi-mode digital radios (MDR) in order to reduce costs;
- Provide new data link communications capability to all classes of users;
- Reduce A/G radio frequency (RF) interference;
- Enhance security through inherent technology, which will reduce the threat from unauthorized users.

The NEXCOM Program will implement a digital system that will relieve the spectrum congestion problem, afford additional channel control and security, and provide the capability for A/G data link.

The program is planned for implementation in three segments. Segment 1 addresses the high and ultra-high sector air traffic control voice channels in the en route environment. Segment 1 is divided into two phases. Segment 1a will test and procure MDR. During Segment 1b, NEXCOM system hardware/software will be deployed after completing an operational demonstration of VDL mode 3. NEXCOM will continue to operate in the present analog mode until users can equip with the new avionics (2008) when a transition to digital voice will begin. Segment 2 will add the interfaces and telecommunications lines necessary to provide data link capability to the en route channels converted to digital voice in Segment 1. Segment 3 will implement both digital voice and data capability in the high-density terminal areas.

Category 2: 2B02 En Route Automation Program
En Route Automation Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency at all ARTCCs through the use of a modern, open, and supportable en route automation environment that has the capability to readily adapt to evolving requirements and meet the long-term requirements for availability, capacity, and efficiency.

The En Route Automation Modernization (ERAM) Program will improve system efficiency in the NAS by providing an open, standards-based en route automation system that improves overall system availability, satisfies increased NAS capacity demands and new capability requirements, and integrates advanced technologies. ERAM will accomplish this goal by replacing the legacy en route automation hardware/software with new subsystems and tools that support the objectives of the FAA's modernization initiatives, including the OEP and free flight. ERAM will assist with the improved capabilities to support NAS Architecture, Version 4.0, free flight initiatives, ATS operational needs, and information security requirements. The ERAM system design will allow fielding planned upgrades and will reduce life cycle cost through the use of COTS/NDI products. Improved surveillance data processing will enhance system safety by improving the accuracy and intent of aircraft operating in en route airspace. Improved flight data processing will enhance flight reroute and flight data distribution capabilities, trajectory modeling, and aircraft flight plan conformance algorithms in addition to improving airspace management flexibility and adaptability.

ERAM will provide an expandable and scalable automation infrastructure that can meet increasing traffic demands and accommodate the introduction of new automation functions necessary for improved system efficiency. ERAM will establish a new automation processing architecture that eliminates existing architectural constraints for enhancing efficiency, capacity, and flexibility.

ERAM initiatives can be grouped into three areas: replacement of the en route automation infrastructure, including the host and direct access radar channel (DARC) systems; enhancements to improve system services, including flight plan pre-processing (FPPP) and automation assisted dynamic rerouting (AADR); and separation of non-safety critical services from safety critical applications, including en route support software offload and en route information display system (ERIDS).

Category 2: 2B03 Weather and Radar Processor
Weather and Radar Processor – Stage 3 – Sustain Weather Operations

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide timely weather data acquisition and dissemination capability to ensure safe air traffic control. The weather and radar processor (WARP) provides for full FAA usage of NEXRAD doppler weather radar information. WARP will also provide the most timely and accurate forecast weather products to other systems in the NAS, significantly improving NAS capacity. WARP is an automated processing system that continuously acquires, stores, distributes, and displays weather information and radar products from external sources.

The WARP Program consists of Stages 1 and 2—development and implementation of the display system replacement (DSR) interface to provide controllers with NEXRAD weather radar data and other necessary NAS interfaces—and Stage 3—maintain weather operations by making upgrades to accommodate changes made to WARP input sources (data, models, and sensors), provide for cost effective weather data sharing through interfaces to other NAS subsystems, and facilitate a common situational awareness within the en route environment. Stage 1, Phase 1 and 2, will provide improved products for the meteorologist, as well as NEXRAD weather radar data to air

traffic controllers on the DSR. WARP Stages 1 and 2 will mosaic the various NEXRAD radar data, and compress NEXRAD's eight levels of weather into three for FAA air traffic controller use. In Stage 1, the FAA will transition from leased to an FAA-owned hardware system. WARP Stage 3 requirements will be implemented as discrete tasks.

Category 2: 2C04 Aircraft Fleet Modernization
Research and Development, Aircraft Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Acquire a modern jet transport aircraft equipped with a suite of digital cockpit avionics representative of the current and future U.S. airline jet aircraft population to perform required various airborne R&D and test and evaluation functions in support of agency goals.

The FAA is unable to perform critical in-flight jet transport test functions required to serve the U.S. air carrier industry in validating proposed new CNS and landing systems. The agency also is unable to analyze/measure human factors impacts on jet transport pilots and crews induced by new aviation concepts and technologies, systems integration, equipment, and procedures needed for transition to the "new NAS." The agency's 32-year-old Boeing Model B-727 jet transport aircraft—historically used for these functions—has become technologically incapable of performing meaningful and relevant testing demanded by the U.S. airlines to expand NAS capacity through free flight and Safer Skies initiatives. A new aircraft will re-establish the agency's lagging credibility with the airlines by performing timely, aggressive, and effective in-flight testing with the confidence and integrity of an aircraft representative of the current and future air carrier fleet. Critical tests will be performed as required in the transition from the controller-based air traffic control environment to the ATM environment of pilot/controller shared responsibility. ATM requires the transmission of air traffic control and weather data to a digital cockpit for the pilot's use. A digital cockpit will process and display data received from the ground and from satellite transmissions. As a critical part of the transition from air traffic control to ATM, the FAA will be capable of analyzing the impacts of introducing advanced digital technologies to the cockpit and the additional information processing/decision-making required of the flight crew. Analyses also will consider the coordination of decision-making and procedures in the cockpit and on the ground and the human factors/safety implications.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Secondary Outcome Goal: FAA Goal: FAA Goal: Economic Growth: Support a transportation system that ensures a safe, secure aerospace system that is efficient for users.

Secondary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Secondary Outcome Goal:
Increase significant cost savings over present operating cost and cost avoidance from expected operating expenses for the present 32 year-old aircraft.

Other benefits will be less-frequent scheduled and unscheduled maintenance, improved COTS parts availability and warranties, and lower operating costs made possible by more fuel-efficient engines that also provide increased range. The increased range will allow increased time aloft required for research, test, and evaluation activities, including future CNS systems and procedures.

Category 3

Definition of Category 3: Increase Capacity of the National Airspace System

This category contains programs relevant to increasing the throughput of the NAS.

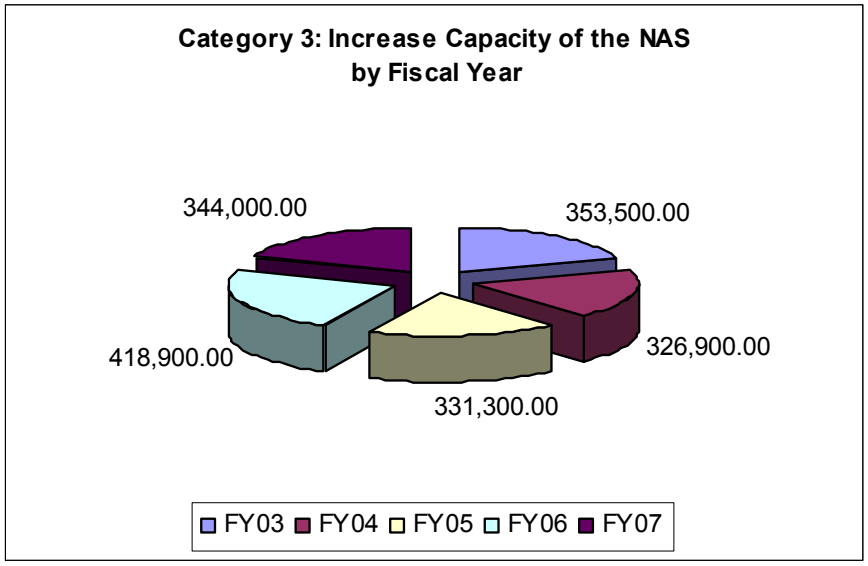
FAA Goal: System Capacity: *Provide an aerospace transportation system that meets the needs of users for entry and use of FAA, NAS, and other aerospace resources.*

Strategies to Achieve FAA Goals:

FAA Annual Performance Goals:

Flight Route Flexibility – *Attain a cumulative increase in throughput during peak periods at certain major airports. FY 2002 goal is a 3.8 percent increase from the FY 2000. (FY 2003 goal to be determined)*
Attain a cumulative increase in direct routings for the en route flight phase. FY 2002 goal is a 7.6 percent increase over the FY 2000 baseline. (FY 2003 goal)
Aviation Delays – *Reduce aviation delays to no more than 171 per 100,000 activities.*
Runway Pavement Condition – *Maintain the percent of runways in good or fair condition (commercial service and selected GA airports). FY 2002 goal is at least 95 percent of runways. (FY 2003 deletes this goal)*

The following graph indicates distribution of funding for F&E programs in Category 3: Increase the Capacity of the NAS for FY 2003 to 2007. Funding in thousands.



Category 3: 3A01 Navigation and Landing Aids: 3A01A Local Area Augmentation System for Global Positioning System

- **Local Area Augmentation System for Global Positioning System**
- **Local Area Augmentation System – Advanced Technology Development and Prototyping**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Increase system safety and efficiency by providing a satellite-based precision approach capability to the NAS that meets the requirements for all weather approach and landing capability.

Augmentation is required to make the GPS fully usable for all phases of flight since the coverage, accuracy, availability, and integrity provided by GPS will not be sufficient to meet FAA precision landing requirements. The LAAS will complement the WAAS by providing Category (CAT) I and CAT II/III precision approach capabilities. LAAS provides precise correction data to airborne and surface receivers that will supply a navigation accuracy of less than one meter to a minimum distance of 23 miles. LAAS will meet CAT I navigation and landing requirements at locations where WAAS is unavailable due to insufficient satellite coverage or availability, e.g., some sites in Alaska. In addition, LAAS will meet the more stringent CAT II/III precision approach requirements.

Category 3: 3A01 Navigation and Landing Aids: 3A01B Wide Area Augmentation System for Global Positioning System

- **Wide Area Augmentation System for Global Positioning System**
- **Wide Area Augmentation System – Satellite Telecommunications**
- **Wide Area Augmentation System – Advanced Technology Development and Prototyping**

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Provide benefits to both aviation users (through efficiencies, safety, and simplification of avionics) and the government through reduced ground-based facility costs. The qualitative benefits include improved safety while operating in reduced weather conditions, improved efficiency at airport operations due to greater runway availability, reduced separation, more direct en route paths, and new precision approach services to the public.

Commission the WAAS, an augmentation to GPS, in December 2003. WAAS will initially provide non-precision lateral navigation (LNAV) and vertical navigation (VNAV) for 75 percent of the Conterminous United States, with an availability of 95 percent or greater. In later implementations, it will provide global navigation satellite system (GNSS) landing system (GLS) approach services, increasing safety, mobility, system efficiency, and capacity in the application of FAA and aerospace resources.

WAAS is a safety-critical navigation system. Its capability is to provide a quality of positioning information never before available to the aviation community. As the system name implies, WAAS is both a functional and geographically extensive augmentation to the basic GPS service. WAAS improves the accuracy, integrity, continuity, and availability of basic GPS signals. This system, through its augmentation, will permit the FAA to certify WAAS to be used as a means of navigation for en route travel and non-precision approaches in the United States. Ultimately, WAAS will provide precision approach capability to selected airports throughout the nation. The system coverage will include the Conterminous United States, some border areas of Canada and Mexico, and limited service in Hawaii, Alaska, and Puerto Rico. WAAS will improve basic GPS accuracy to 7.6 meters vertically and horizontally, improve system availability using leased geostationary communication satellites carrying navigation payloads, and provide important integrity information about the entire GPS constellation.

WAAS currently consists of a network of 25 ground reference stations, termed Wide Area Reference Stations (WRS). Signals from GPS satellites are received at WRSs. Each of these precisely surveyed reference stations receives GPS signals and, through computational verification and validation, determines whether signal errors exist or not. FAA telecommunications assets link these WRSs to form the U.S. WAAS network. Each WRS in the

network relays the data to Wide Area Master Stations (WMS) where network correction information is computed. The WMSs use corrections algorithms to assess the integrity of the system.

A correction message is prepared and uplinked to leased geostationary communications satellites via a dedicated WAAS ground uplink system (GUS). The message is then re-broadcast on the same frequency as GPS (L1, 1575.24 megahertz (MHz)) to receivers aboard aircraft within the WAAS broadcast coverage volume. The geostationary communications satellites also act as additional navigation signal sources for the aircraft, thus providing supplemental navigation signals for position determination.

Secondary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Secondary Outcome Goal:
Support the goal of providing an aerospace transportation system that meets users' needs and is efficient in the application of FAA and aerospace resources. The overall objective of the FAA's program, Augmentation for the GPS, is to meet the highest levels of safety while providing the integrity, availability, continuity, and accuracy necessary for use as the primary means of navigation during all phases of flight from en route through CAT I precision approaches.

Aviation industry leaders recognize the potential of augmented GPS for enhanced safety and operational capabilities, and are committed to a transition to space-based navigation. Therefore, some of the major effects that result from augmented GPS operations are:

- Reduction in approach accidents;
- Recommendation from Safer Skies: eliminate non-precision approaches (NPA);
- Improvement in overall safety for precision approaches;
- Addition of precision approaches to over 3,000 runway ends;
- Reduction in controlled-flight-into-terrain (CFIT) accidents;
- Provision of robust positioning information to support TAWS;
- Reduction in surface accidents;
- Provision of positioning information to help reduce runway incursions (major benefits emerge when coupled with future technologies).

Category 3: 3A01 Navigation and Landing Aids: 3A01C Equipment (Distance Measuring Equipment) Very High Frequency Omni-Directional Range Collocated with Tactical Air Navigation

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing, relocating, or converting VHF omni-directional range (VOR)/VOR collocated with tactical air navigation (VORTAC) facilities in order to maintain a reliable, safe, and efficient air navigation system used for en route and approach purposes.

VOR/VORTAC will increase the system efficiency of the NAS by providing the necessary enhancements, upgrades, and relocations to VOR/VORTAC facilities that are experiencing signal deterioration due to various environmental factors. This program provides for field installation of low-power tactical air navigation (TACAN) antenna retrofit kits, relocation of VOR facilities, and conversion of existing facilities to a doppler configuration.

Category 3: 3A01 Navigation and Landing Aids: 3A01D Instrument Landing System – Establish/Upgrade Instrument Landing Systems

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by providing the necessary equipment to establish, replace, and maintain the precision approach capability at various airports. This program establishes, replaces, and maintains new, partial, and full CAT I/II/III instrument landing systems (ILS) and associated equipment. ILS can meet increasing traffic demands and is a proven technology that can sustain current operations and can be expanded or retracted as necessary to meet agency direction.

Category 3: 3A01 Navigation and Landing Aids: 3A01E Approach Lighting System Improvement Program Visual Navigation Aids – Approach Lighting System Improvement Program Continuation

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Improve safety in the NAS by replacing rigid, non-frangible lighting support structures with frangible approach lighting equipment.

The Approach Lighting System Improvement Program (ALSIP) will improve safety in the NAS by providing frangible lighting equipment including the high intensity approach lighting system with sequenced flashers (ALSF) model 2 and the medium intensity approach lighting system with runway alignment indicator lights (MALSR).

Category 3: 3A01 Navigation and Landing Aids: 3A01F Runway Visual Range Runway Visual Range – Replacement/Establishment

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years. System

Narrative for Primary Outcome Goal:
Improve safety in the NAS by replacing the older, maintenance intensive and difficult to support legacy systems (runway visual range (RVR), SSR, and Tasker 400s and 500s). RVR systems provide critical meteorological visibility information that is necessary for takeoff and landings on precision approach equipped runways. These older systems are frequently supported on rigid, steel, non-frangible structures.

RVR replacement will improve safety in the NAS by providing modern RVR equipment. The new generation RVR equipment is mounted on frangible, low impact resistant structures that will break away in the unlikely event an aircraft should strike the equipment during takeoff or landing.

Category 3: 3A01 Navigation and Landing Aids: 3A01G Distance Measuring Equipment – Sustain Distance Measuring Equipment – Sustain

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing obsolete, tube-type distance measuring equipment (DME) that provides critical distance information to pilots during preparation for landings.

The DME Sustain Program will increase system efficiency by providing current technology electronics that will improve operations and facilities performance. The current technology DME will help reduce maintenance costs by replacing the older DME that is difficult and expensive to maintain because replacement parts are either difficult to obtain or unavailable. The upgraded equipment will also improve system efficiency by reducing the downtime required for the maintenance/repair of the antiquated DME systems.

Category 3: 3A01 Navigation and Landing Aids: 3A01H Non-Directional Beacon Facilities – Sustain
Non-Directional Beacons Sustain

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing obsolete, tube-type non-directional beacons (NDB) with current technology electronics that continue to provide navigational direction information.

NDB Sustain will increase system efficiency by providing current technology electronics that will upgrade equipment, thereby improving operations and facilities performance. The current technology NDB will help reduce maintenance costs by replacing the older NDB systems that are difficult and expensive to maintain because of parts obsolescence. The upgraded equipment will improve system efficiency by reducing downtime required for the maintenance/repair of the antiquated NDB systems.

Category 3: 3A01 Navigation and Landing Aids: 3A01I Visual Navigation Aids – Establish/Expand
Visual Navigation Aids – Visual Navigation Aids for New Qualifiers

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Increase system efficiency of the NAS by providing the necessary equipment, including precision approach path indicators (PAPI) and runway end identifier lights (REIL), to establish a visual approach capability at various airports. This program establishes the necessary visual equipment to aid pilots to quickly identify the runway threshold and make stabilized descents for clearance over obstructions.

Category 3: 3A01 Navigation and Landing Aids: 3A01J Visual Approach Slope Indicator Replacement – Replace with Precision Approach Path Indicator
Visual Navigation Aids – Replace Visual Approach Slope Indicator Replacement with Precision Approach Path Indicator

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing aging, obsolete visual approach slope indicators (VASI) with new technology, the more standardized PAPI.

The Replace VASI with PAPI Program will add system efficiency to the NAS by providing the necessary equipment to upgrade and standardize visual approach angle capability at various airports. The upgraded equipment will improve system efficiency by reducing the downtime required for the maintenance/repair of the older system and by reducing the technician's time required to adjust the aiming angle on the older, less precise VASI.

Category 3: 3A01 Navigation and Landing Aids: 3A01K Instrument Approach Procedures Automation
Instrument Approach Procedures Automation

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by providing automated tools, including the ability to digitize maps and charts, that allow FAA specialists to develop more timely and accurate instrument approaches for pilots into airports clear of obstacles such as radio towers, buildings, and trees. In addition, the instrument approach procedures automation (IAPA) tool will meet expanding air traffic control needs (e.g., the FAA receives 30,000 annual requests to erect more obstacles near airports. The automated tools help to reduce the time it takes to evaluate, revise, and update the approaches).

Category 3: 3A01 Navigation and Landing Aids: 3A01L Navigational and Landing Aids – Service Life Extension Program (Long-Range Navigation – C)
Long-Range Navigation – C Monitors and Transmitter Enhancements

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Support system efficiency by determining whether long-range navigation – C (LORAN-C) can provide navigation support and other benefits to aviation.

Although the current LORAN-C system can be used for en route navigation, no approaches exist. The goal of the program is to determine whether the accuracy, availability, integrity, and continuity of an enhanced LORAN-C transmitter and receiving system will be able to meet the requirements for LNAV, Required Navigation Performance (RNP) 3. Another ancillary benefit to aviation will be to determine whether LORAN-C can provide an alternative means of transmitting the WAAS correction signal to aircraft where reception from geostationary satellites may be problematic (e.g., high latitudes).

Category 3: 3A01 Navigation and Landing Aids: 3A01M Navigation and Landing Aids – Service Life Extension Program
Visual Navigation Aids – Sustain, Replace, Relocate

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing aging, obsolete visual navigational aids as well as other ground-based navigation and landing aids that are necessary in order to maintain en route, approach, and landing capabilities at various airports throughout the United States.

The upgraded equipment will improve system efficiency by reducing the downtime required for the maintenance/repair of the older system and by reducing the technician's time required to service each of the navigation and landing aids under this program. Equipment under this program includes the following navigation and landing aids: ALSF-2, MALSR, PAPIs, REILs, VORs, DME, and NDBs.

Category 3: 3A02 Oceanic Automation System
Advanced Technologies & Oceanic Procedures

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Increase system efficiency in all Oceanic ARTCCs through the modernization of the oceanic air traffic control systems. When in place, the new integrated satellite-based system, combined with new air traffic control procedures, will render a new concept of operations, providing significant benefits to the FAA and its customers. The advanced technologies & oceanic procedures (ATOP) system, which does not rely on paper strips, will provide the following:

- A new platform to deliver customer benefits through increased air traffic control efficiencies and capacity;
- A fully integrated flight data processor, radar data processor, and satellite-based data link communication and surveillance (e.g., automatic dependent surveillance address (ADS-A));
- Controller tools, such as conflict probe.

In addition, the system will enable reduced separation standards – 30/30 longitudinal/latitudinal separation, which will result in the most efficiently managed oceanic airspace in the world.

The FAA manages 80 percent of the world's controlled oceanic airspace, airspace that is beyond domestic coverage with land-based air traffic control infrastructure, including radar. The FAA provides air traffic control services for oceanic flights within an area of approximately three million square miles in the Atlantic Ocean and 18 million square miles in the Pacific Ocean. This airspace is not sovereign—the ICAO delegated the airspace to the Civil Aviation Authorities, of which the FAA is one, and can reassign the airspace at any time. The Oakland ARTCC, the New York ARTCC, and the Anchorage ARTCC presently manage this airspace.

Oceanic air traffic control differs from domestic air traffic control largely because there is no radar tracking of aircraft and no direct radio communication. Oceanic air traffic controllers must rely on other sources of aircraft position information, including voice position reports from pilots derived from on-board navigation systems that include the GPS and communications satellite information. In turn, this lack of reliable and timely position information requires large aircraft separation standards that severely limit the useable system capacity. As a result, oceanic users are rarely able to obtain maximum fuel efficiency, minimum travel durations, and access to preferred takeoff times and flight paths.

Oceanic air traffic is projected to continue to grow at a higher rate than domestic air traffic, primarily in the highest density areas. In addition, the market demands expanded capacity through improved operational and fuel efficiency. The FAA's current oceanic system is approaching maximum operating capacity. An integrated, modernized oceanic air traffic control system is required to increase oceanic air traffic capacity and efficiency, without degrading safety, and to enable the introduction of free flight in oceanic airspace.

The ATOP contract will replace the oceanic systems at the Anchorage, New York, and Oakland ARTCCs. The new oceanic system will collect, manage, and display oceanic air traffic data, including electronic flight-strip data, on the computer displays used by air traffic controllers, and it will integrate capabilities such as flight data processing, radar data processing, automatic dependent surveillance (ADS), controller-pilot data link, and conflict probe. The ATOP system, along with accompanying new oceanic procedures, will increase capacity and efficiency by providing enhanced prediction of aircraft and airspace conflicts, improved communications, automation tools that allow reallocation of sector workloads and eliminate time consuming manual tasks, and support for reduced separation standards through full use of CNS capabilities. As components of the ATOP architecture, sustainment and improvement to the MicroEARTS platform, as well as ongoing upgrades to existing oceanic legacy systems: oceanic display and planning system (ODAPS), interim situation display (ISD), telecommunications processor, oceanic data link (ODL), air traffic services interfacility data communications (AIDC) systems, and dynamic ocean tracking system plus (DOTS+) is required.

Category 3: 3A03 Gulf of Mexico Offshore Program
Gulf of Mexico Offshore Program

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Outcome Goal:
Establish two-way voice and data communications that will permit less stringent offshore separation standards (space) and flight route changes over the Gulf of Mexico (GOM), thus increasing capacity and reducing delays.

The GOM Program (GOMP) currently is developing an approach to improve efficiency and capacity while enhancing the currently inadequate communication coverage over the GOM. This project is comprised of two systems: the buoy communications system (BCS) and the VHF extended range network (VERN). These systems are directed at expanding direct controller-pilot VHF radio communications. The combination of the BCS and VERN will improve efficiency and capacity through enhanced communications in the en route portion of the GOM above 18,000 feet. These enhancements offer solutions to current shortfalls as well as proactively address future anticipated growth and user demand for efficient use of the GOM airspace.

Category 3: 3A04 Voice Switching and Control System

- **Voice Switching and Control System – Voice Switching and Control System Control System Upgrade**
- **Voice Switching and Control System – Technology Refresh**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve operational efficiency and effectiveness of the NAS by replacing and upgrading the voice switching and control system (VSCS) equipment at all en route ARTCCs, including the Mike Monroney Aeronautical Center and the William J. Hughes Technical Center (WJHTC).

The VSCS Program provides effective en route air traffic control services to airspace users through A/G and G/G communication systems. The VSCS Program modernizes communications systems through the replacement of obsolete, non-supportable VSCS hardware and software to ensure that all VSCSs within the en route environment continue to provide reliable service to air traffic controllers. The sustainment activities planned under this program include software upgrades, power supply upgrades, position electronic module (PEM) upgrades, display module upgrades, and system expansions. Through the performance of these sustainment activities, the VSCS Program improves air traffic control services within the en route environment.

Category 4

Definition of Category 4: Improve Reliability of the National Airspace System

This category contains the efforts to sustain existing and establish and/or implement new NAS services and capabilities. It includes programs that protect and enhance communities and the natural environment affected by transportation.

FAA Goal: Reliability of the NAS: *Provide an aerospace system infrastructure that is available for aerospace users.*

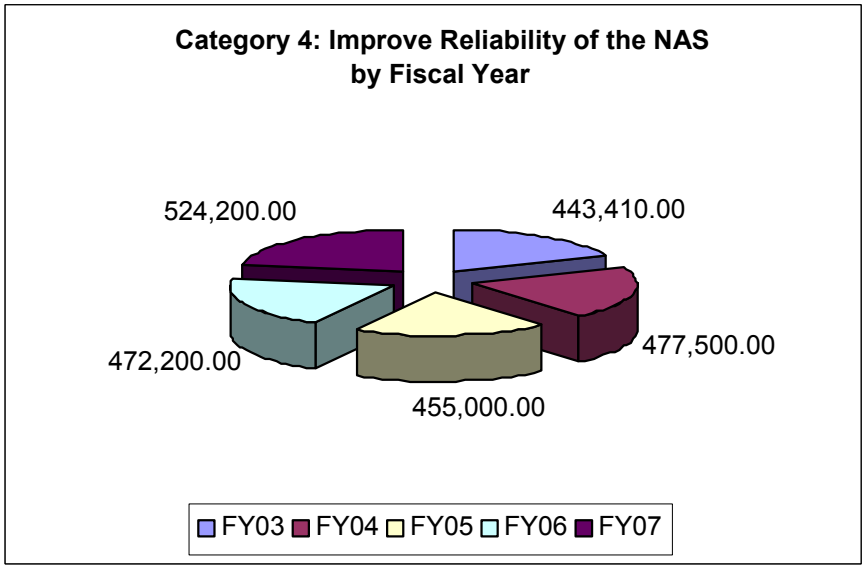
Strategies to Achieve FAA Reliability of the NAS Goals:

NAS Modernization: *Using the NAS Architecture as the guideline, continually refine and update the NAS to achieve efficient aerospace systems and operations.*
Systems Integration: *Integrate airport and commercial space transportation into NAS requirements.*

FAA Annual Performance Goals:

> ***Service Reliability –*** *Maintain or increase navigation aid, sensor, and communications systems availability levels commensurate with percentages in the NAS System Requirements 1000 (SR1000).*
> ***Operational Efficiency and Effectiveness*** *– Provide services at a lower cost without reducing availability of facilities, infrastructure, or equipment (the target level of performance for this goal has not been defined by Office of the Secretary of Transportation (OST)/FAA).*

The following graph indicates distribution of funding for F&E programs in Category 4: Improve the Reliability of the NAS for Fiscal Years 2003 to 2007. Funding in thousands.



Category 4: 4A01 Guam Center Radar Approach Control – Relocate
Relocate Guam Center Radar Approach Control

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency at the Guam Center Radar Approach Control (CERAP) by relocating operations from the existing CERAP at Andersen Air Force Base (AFB) to the FAA Base Building at the Agana International Airport. The existing base building at the Agana International Airport will be renovated and expanded to accommodate CERAP operations, NAS equipment, and associated environmental support equipment.

The existing Guam CERAP facility was constructed in 1960 on Andersen AFB. This facility incurred significant damage from Super Typhoon Paka in 1997. Minimal stopgap repairs were made following the typhoon. Facility maintenance and modernization projects are difficult to program, as the DoD owns the building. Additionally, when military operations are underway, access to the facility is restricted. Working conditions within the CERAP are presently unacceptable. In 1998, a decision was made to relocate the existing CERAP to an FAA-owned base building at the Agana International Airport.

Category 4: 4A02 Terminal Voice Switch Replacement/Enhancement Terminal Voice Switch
Enhanced Terminal Voice Switch

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency of the NAS by replacing the electromechanical and aging electronic switches in all ATCTs and TRACON facilities with modern reliable voice-switching systems.

The Terminal Voice Switch Replacement (TVSR) Program enables effective air traffic operations at all terminal facilities by replacing older, non-supportable electronic and electromechanical voice switches. The TVSR Program consists of several multi-year equipment contracts, including small tower voice switch (STVS) systems, operational support telephone systems (OSTS), enhanced terminal voice switch (ETVS) systems, rapid deployment voice switch (RDVS) model IIA systems, and voice switch by-pass (VSBP) systems. Modern voice switches, like ETVS and RDVS IIA, meet the needs of the air traffic controllers and enable more effective air traffic operations.

Category 4: 4A03 Airport Cable Loop Systems – Sustained Support
Airport Cable Loop Systems Sustained Support

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by enhancing communications outages and increasing system performance from multiple pathways.

By implementing this program, the agency will now have a standard design and method to install fiber optic transmission systems (FOTS) throughout the NAS. Standardizing the design requirements will simplify logistics, configuration management, training, and depot support.

Category 4: 4B01 En Route Automation Program

- **(A) En Route Automation Program – En Route Enhancements**
- **(B) En Route Automation Program – Flight Data Input/Output Replacement**
- **(C) En Route Automation Program – Direct Access Radar Channel**
- **(D) En Route Automation Program – Host/Oceanic Computer System Replacement**
- **(E) En Route Automation Program – En Route Communications Gateway**
- **(F) En Route Automation Program – En Route System Modification and Voice Switching and Control System Electronic Module/Position Electronic Module Relocation**

(A) En Route Automation Program – En Route Enhancements

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide software evolution, as prioritized and approved by air traffic and airway facilities, to add new capabilities and enhancements to the host and DSR software and to address critical software problems. The host and DSR are the primary processor and display system used to control air traffic. While the level of effort maintained is not sufficient to incorporate all air traffic and airway facilities operational needs, current funding levels have been adequate to incorporate high priority changes

The En Route Enhancements Program supports the FAA system efficiency goal by maintaining and enhancing host and DSR system software at the ARTCCs.

(B) En Route Automation Program – Flight Data Input/Output Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Support the FAA system efficiency goal by maintaining and replacing obsolete flight data input/output (FDIO) equipment.

(C) En Route Automation Program – Direct Access Radar Channel

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Maintain an enhanced independent back-up radar automation system capable of continuously improving the functionality. This program will eliminate legacy hardware and interfaces and replace the current software architecture with one that provides hardware independence.

(D) En Route Automation Program – Host/Oceanic Computer System Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Maintain the reliability and performance of the host and oceanic computer systems within the NAS to prevent future major outages of air traffic control services. The host/oceanic computer system replacement (HOCSR) provides operational air traffic control capabilities in the mission areas of safety and capacity, and provides secondary benefits in the mission area of productivity/business practices.

HOCSR will increase the system efficiency of the NAS by providing mobility through the replacement of the primary en route computer system hardware (host) in the 20 en route centers, the oceanic systems (ODAPS) in two centers, and the offshore flight data processing system in Honolulu, HI. The HOCSR Program is a key component of the ongoing modernization of the FAA NAS infrastructure. HOCSR extends the life of the many hardware components that have reached their end of life service. The host and oceanic computers are the foundation of the FAA's automated air traffic control environment. The computers receive, process, coordinate, distribute, and track information on aircraft movement throughout the nation's airspace as well as the borders of oceanic airspace. The computers connect to all types of FAA services—ATCTs, TRACON facilities, flight service stations (FSS), adjacent flight information regions, host and oceanic computers at other centers, and external organizations such as the U.S. Customs Service and the U.S. Military. The computers are key to the FAA's ability to implement new services, concepts, and traffic flows for the airline industry and the flying public. The availability of these computers is critical to maintaining the nation's commerce.

(E) En Route Automation Program – En Route Communications Gateway

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Increase system capacity and expandability by minimizing the time that full operational services are not available, and by enabling the integration of new surveillance technology, the introduction of new interface standards and formats, and connectivity to additional remote equipment (e.g., radar). The en route communications gateway (ECG) infrastructure will provide the automation system capacity and expandability required to support anticipated increases in air traffic and changes to the operational environment. By providing a flexible and expandable architecture, ECG must be deployed prior to the introduction of new services, systems, and capabilities.

ECG, a replacement system, is a combination of new functionality and capability. ECG will replace the current peripheral adapter module replacement item (PAMRI) functions deployed at the ARTCCs, subsume certain legacy functions, and provide the foundation for new radar/surveillance sources and new communications sources. In addition to supporting external legacy interfaces, ECG will provide an initial set of external Internet Protocol (IP) interfaces. The ECG architecture will include the capability for adding modern interfaces to the host computer system (HCS) and DARC platforms and support future applications that require ECG data processing. ECG software development will be minimal. Overall, the ECG Program will meet the En Route Integrated Product Team (IPT) objectives to evolve from legacy systems to an open system architecture and modern protocols. All hardware to be fielded in support of ECG will be COTS.

(F) En Route Automation Program – En Route System Modification and Voice Switching and Control System Electronic Module/Position Electronic Module Relocation

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide product modifications and upgrades to replace aging or obsolete components while ensuring that national, agency, and customer requirements are met through cost effective methods that capitalize on the technology evolution, supporting growth in NAS functionality and providing system flexibility.

The En Route System Modifications (ERSM) Program will provide modifications to aging or obsolete components of the display system. This program will provide an incremental transition to newer components to ensure that the system infrastructure is supportable, that enhanced user functionality can be supported, that system growth is not curtailed by product obsolescence or shortages, that planned system functionality enhancements can be supported, and that integration of advanced technologies is possible.

Category 4: 4B02 Air Route Traffic Control Center Building Improvements/Plant Improvements
Air Route Traffic Control Center Plant Modernization/Expansion – Air Route Traffic Control Center Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Continue improvements to re-capitalize facilities providing new services.

Support operational efficiency and effectiveness by maintaining the integrity of 21 ARTCCs, three CERAP facilities, and the Air Traffic Control System Command Center (ATCSCC), and ensure facility sustainment, modernization, and expansion to support air traffic control operations. This will aid in the integration and transition of new NAS systems within ARTCCs, CERAPs, and the ATCSCC and the management of the life cycle of these facilities.

Category 4: 4B03 Air Traffic Management
(A) Air Traffic Management – Air Traffic Management Functionality Development/Deployment – Departure Spacing Program
(B) Air Traffic Management – Traffic Flow Management Infrastructure – Infrastructure Modernization

(A) Air Traffic Management – Air Traffic Management Functionality Development/Deployment – Departure Spacing Program

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Continue the development of the departure spacing program (DSP) prototype and the eventual integration of the DSP functionality into a modernized TFM infrastructure that will result in a reduction of system-wide delays while facilitating achievement of collaborative decision-making (CDM) and free flight operating concepts.

The current TFM infrastructure requires modernization to allow full traffic system integration. The DSP prototype system is being expanded into additional Northeast U.S. Corridor facilities in the Boston, MA, and Washington, D.C., metropolitan areas and will eventually require integration into the TFM infrastructure and further evaluation for consideration of NAS-wide implementation. DSP provides more efficient departure management tools to decrease the amount of delays and lower associated costs of imposed delays, thus providing greater economic benefit to the user community.

(B) Air Traffic Management – Traffic Flow Management Infrastructure – Infrastructure Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Serve as a primary source of information to be used by the FAA and NAS users to manage irregular operations as a result of congestion, avoidance of severe weather, and/or other disruptive events. The current infrastructure has been successfully expanded to support Free Flight Phase 1 initiatives. However, limitations in both the existing software architecture and the aging hardware on which it resides will restrict the level of integration with the en route domain and AOC flight planning systems that is desired by the operational community. In addition, TFM modernization will supply the hardware/software required for the assimilation of the standalone functionality provided by DSP, collaborative routing and coordination tools (CRCT), and other new traffic flow initiatives.

Category 4: 4C01 Critical Telecommunications Support
Critical Telecommunications Support

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency and effectiveness by providing modifications to existing telecommunications systems at over 5,000 facilities within the NAS. Critical telecommunications support (CTS) provides funds for air traffic communications diversity, un-programmed telecommunications additions, moves, modifications, and emergency requirements.

Category 4: 4C02 Federal Aviation Administration Telecommunications Infrastructure
Federal Aviation Administration Telecommunications Infrastructure

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve telecommunications services within the NAS infrastructure through an integrated approach. The FAA Telecommunications Infrastructure (FTI) will acquire a wide range of contractor-provided service delivery points (SDP) to SDP telecommunications services with integrated network management and provisioning capabilities. Over the next decade, FTI will incrementally replace existing NAS telecommunications systems. FTI will reduce unit costs for telecommunications services, increase bandwidth utilization, and improve efficiency and effectiveness by using modern business practices. FTI centralizes management and security functions and improves flexibility to support new and emerging air traffic systems.

Category 4: 4C03 Air-to-Ground Communications Infrastructure
- **Communications Facilities Enhancement – Expansion**
- **Communications Facilities Enhancement – Limited Radio Replacement Program**
- **Communications Facilities Enhancement Air-to-Ground Communications Radio Frequency Interference Elimination**
- **Backup Emergency Communication – Replacement**
- **Radio Control Equipment**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Enhance operational efficiency and effectiveness through planned improvements to the A/G communications infrastructure that involve replacing aging and increasingly unreliable equipment and improving associated sites and facilities, including the establishment of new facilities intended to broaden communications coverage. The A/G Communications Infrastructure Program is the combination of the following CIP projects:

- Communications Facilities Enhancements (CFE): Provide new radio control facilities and/or modify existing facilities to enhance the A/G communications between air traffic control and aircraft;
- CFE Limited Radio Replacement: Procure high-low VHF transmitters and receivers;
- Radio Frequency Interference Elimination (RFI) Elimination: Provide modern communication and ancillary equipment to improve operational performance at select remote communication facilities;
- Back-up Emergency Communications (BUEC): Provide a dedicated channel/sector in place of a priority based, shared outlet system. Replace current 1970s system that is logistically unsupportable;

- Radio Control Equipment (RCE): Provide equipment used to control A/G radios from a remote location. Replace vacuum-tube equipment that is maintenance intensive and logistically unsupportable.

Category 4: 4C04 Voice Recorder Replacement Program
Voice Recorder Replacement Program

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency of the NAS by replacing aging, analog voice recording systems with modern digital voice recording systems (DVRS). DVRSs enable air traffic controllers to effectively record all voice communications between the controllers, pilots, and other ground-based air traffic control facilities, which meets the statutory requirement.

The Voice Recorder Replacement Program (VRRP) enables effective air traffic operations through the replacement of aging, analog voice recorders with DVRSs. The VRRP will replace a total of 530 voice recorders systems at various ATCTs, TRACON facilities, automated flight service stations (AFSS), and ARTCCs. Through the deployment of DVRS, the VRRP will enable reliable and legal recording services, while reducing maintenance staffing requirements and life cycle maintenance costs.

Category 4: 4C05 National Airspace System Infrastructure Management System
National Airspace System Infrastructure Management System – Phase 2

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of the users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Establish a National Operations Center (NOCC) and three strategically located operations control centers (OCC) to centralize information and technical expertise. Field a COTS-based information system that consists of distributed computers, integrated software and database applications, remote monitoring, and control capabilities. The NAS infrastructure management system (NIMS) will provide the necessary tools to FAA maintenance personnel to support ATS in meeting demand for increasing services with diminished resources while maintaining safety.

To maintain the increasing numbers of new systems and facilities being added to the NAS as part of the modernization program, increased field maintenance staff of about 2,000 is required to maintain the system availability at the level necessary for the FAA to perform its mission. The NIMS Phase 2 project provides the capability necessary to avoid the costs associated with increasing staff levels, and employs a centralized maintenance concept along with associated infrastructure management tools.

Secondary Outcome Goal: FAA Goal: National Security: Prevent security incidents in the aviation system.

Narrative for Secondary Outcome Goal:
Establish an NOCC and three strategically located OCCs to centralize information and technical expertise. Field a COTS-based information system that consists of distributed computers, integrated software and database applications, remote monitoring, and control capabilities. NIMS will provide the necessary tools to establish NAS capacity for disaster recovery contingency planning and execution.

NIMS will provide the capability to execute an appropriate national response to local threats or disasters. NIMS will provide the capability to consider availability profiles at all levels ranging from national to local in execution of the disaster recovery plan. NIMS will provide OCC redundancy using integrated fail-over capability and interconnectivity to eliminate the single-point failure mode present in the current NAS organizational infrastructure.

Category 4: 4C06 Flight Service Station Modernization
Flight Services Facilities – Automated Flight Service Stations Facilities Sustainment

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by procuring power conditioning systems for the AFSS to alleviate power problems and accommodate any new load requirement from future systems, including upgrading and sustaining leased and owned FSSs, continuing the replacement of uninterruptible power supplies (UPS) in the FSS to provide reliable power for existing systems and to accommodate the stringent power requirements of new equipment as it is installed to modernize the NAS, and continuing the other infrastructure repairs necessary to maintain the facilities heating, ventilation, and air conditioning (HVAC) systems to ensure the proper environmental control in operations, equipment, and administrative areas.

Secondary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century.
Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Secondary Outcome Goal:
Optimize customer satisfaction with the safety, security, and efficiency of the air transportation system in the United States. This objective requires planning, evaluating, and controlling the system in such a manner as to enable optimizing customer satisfaction, providing funding options together with advantages and disadvantages, then accomplishing modifications, sustainment actions, and expansions that address customer satisfaction.

Category 4: 4C07 Flight Services Automation System Operational and Supportability Implementation System
Flight Services Automation System Operational and Supportability Implementation System

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide on-going operational support, enabling flight service specialists to more efficiently provide weather and flight information for GA pilots. The existing flight services automation system (FSAS) equipment is 1980s technology and is difficult to maintain and support. The operational and supportability implementation system (OASIS) will provide significant improvement in the computer-human interface (CHI) by replacing the existing FSAS display with a graphical user interface. Additionally, new ergonomic equipment consoles will be installed.

The OASIS Program will provide a modified COTS/NDI-based software and COTS hardware leased service. OASIS will replace all existing FSAS hardware and software, enhance the current FSAS operational capabilities, and incorporate the interim graphic weather display system (IGWDS) and the direct user access terminal (DUAT) functionality. Modifying the COTS/NDI-based service has become necessary to meet operational requirements for the system. The AFSS specialists and technicians have identified deficiencies with the current equipment consoles. The FSAS equipment console replacement program will provide ergonomically designed COTS workstation consoles in conjunction with each OASIS installation.

Category 4: 4C09 Flight Service Station Switch Modernization
Automated Flight Service Station Voice Switches

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by replacing the aging, non-supportable FSS voice switches with modern digital voice switches to enhance preflight and in-flight services.

The Automated Flight Service Station Voice Switch Replacement (AFSSVSR) Program will provide pilots with significantly improved access to flight planning, weather, communications, and emergency services deemed essential to the conduct of safe and efficient flight. This modernization program will replace the aging, non-supportable voice switches at 61 AFSSs throughout the NAS and at 14 non-automated FSSs located in Alaska. The principle enhancement of this program is a call transfer capability, which enables the AFSSs to transfer A/G calls to other AFSSs during periods of low demand. When fully implemented, the call transfer capability will significantly reduce operational costs. Through the deployment of modern digital voice switches, the AFSSVSR Program will significantly improve the operational and maintenance aspects of flight service operations.

Category 4: 4C10 Alaskan National Airspace System Interfacility Communications System
Alaskan National Airspace System Interfacility Communications System Satellite Network – Phase II

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve the system efficiency in the NAS by installing a new satellite telecommunications facility at locations where the FAA has experienced poor telecommunications performance. The increase of telecommunications availability provided by the implementation of the Alaskan NAS Interfacility Communications System (ANICS) sites corresponds to a direct increase in the availability of the NAS and improves air safety in Alaska.

ANICS will add system availability to the NAS by providing more reliable telecommunications in several rural areas throughout Alaska. The ANICS Phase II design will increase the availability of communications at these sites from 98 percent commercially available to 99.9 percent available via ANICS. On average, this improvement will decrease outages due to telecommunications from over eight days per year to less than nine hours per year.

At each ANICS Phase II installation site, the FAA will realize cost savings in the monthly recurring telecommunications costs. The average is $340,000.00 net present value (NPV) savings per site over the 20-year life cycle of ANICS, which equates to $17,000.00 NPV cost savings per year on each of the 18 phase II ANICS sites that the JRC has approved to build.

Because the design is based on a completely digital communications stream, it will be easy to take advantage of new technologies that are just now being introduced (e.g., IP networks that include voice over IP). These technologies will allow for an even more reliable cost saving network.

Category 4: 4C11 Electrical Power Systems – Sustain/Support
Power Systems Sustained Support

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by providing reliable quality power for the NAS. These power system sustainment activities will provide a more reliable standby source of quality power to support the continuous delivery of critical and essential air traffic control services within the NAS.

By implementing this program, the agency is merely beginning to impact "the big picture" of several years of power systems deficiencies. This program is expected to achieve cost savings through improved business practices, enhanced training of power maintenance personnel, improved systems efficiency of the airways facilities workforce, and increased safety for FAA employees.

Category 4: 4C12 National Airspace System Recovery Communications
National Airspace System Recovery Communications

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Provide system efficiency to the NAS by ensuring that during emergencies the FAA's command and control communications (C3) will be able to provide time critical public safety and NAS information between the Administrator, the Administrator's staff, key regional managers, the DOT, and other national level executive personnel.

The NAS Recovery Communications (RCOM) Program will add system efficiency to the NAS by providing and enhancing a variety of fixed position, portable, and transportable C3 systems for use in support of emergency operations. Such C3 systems include the automatic digital network (AUTODIN)/defense messaging system, secure telephone unit (STU) third generation/secure telephone equipment (STE), secure facsimile, VHF/frequency modulated (FM), high frequency single side band (HFSSB), satellite telephone network (AMSC), automated notification system (ANS), secure conferencing system (SCS), and communications support teams (CST).

Category 4: 4C13 Aeronautical Center Infrastructure Modernization
Aeronautical Center Infrastructure Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve operational efficiency and effectiveness by providing up-to-date facilities and supporting infrastructure that meets the needs of FAA mission support organizations located at the Aeronautical Center.

The Aeronautical Center lease provides more than 1090 acres of land, over 90 buildings, towers, streets, and infrastructure for the purpose of housing FAA mission support services. Services include training for over 30,000 FAA and international students per year in resident and distance learning formats (Academy, Transportation Safety Institute, and U.S. Coast Guard); logistics and supply support to all FAA locations and approximately 70 DoD and international organizations; cost accounting and payroll services for the FAA and other DOT organizations; engineering services for NAS modification and repair; flight check for calibration/certification of radar/navigation aids at all nation-wide locations; Airmen and Aircraft Records and Registry; aviation medical research and human

factors research; maintenance, administrative, and other support services for the FAA; and support to critical air navigation systems throughout the NAS.

Secondary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century. Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Secondary Outcome Goal:
Provide adequate facilities and infrastructure for organizations that support the agency's model work environment initiatives.

Continue to build model work environments through the improvement of facilities and infrastructure, supporting employee services such as child care, wellness centers, employee credit union, food services, parking, Americans with Disabilities Act (ADA), equal employment opportunities, postal services, employee training and development opportunities, and physical security.

Category 4: 4C14 Frequency and Spectrum Engineering

- **National Airspace System Spectrum Engineering Management – National Airspace System Spectrum Engineering Sustained Support**
- **National Airspace System Spectrum Engineering Management – Frequency Interference Support/Resolution**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS with careful and detailed frequency planning necessary to ensure that current and future aeronautical safety systems are provided adequate radio spectrum in which to operate. In addition, spectrum management support must be provided to both government and non-government offices involved in the operation of current systems and to organizations planning new aeronautical systems.

Frequency and Spectrum Engineering will add system efficiency to the NAS through frequency and spectrum engineering studies for the ICAO to protect frequency bands of the GNSS; to support test planning and to develop frequency assignment and airspace evaluation criteria for the ICAO approved ground-based augmentation system (GBAS); and to finalize the NEXCOM transition plan. Other elements of this program will seek to advance civil aviation interests in the development and coordination of the U.S. position for the 2003 World Radiocommunication Conference (WRC), ensuring protection of aeronautical safety service radio spectrum; to analyze radio spectrum technical and capacity issues associated with selecting the best link for ADS-B implementation; and to ensure radio spectrum support to the FAA's runway incursion program. Other activities include efforts to modernize and develop equipment for more efficient radio frequency engineering and to upgrade existing radio frequency investigation capabilities throughout the NAS, including fixed direction finding equipment to support radio frequency interference to GNSS and configuration management support for all regional radio frequency interference vans. These activities are aimed at reducing air traffic delays. Another critical element of this program is the study and electromagnetic compatibility analysis of the impact of proposed new technologies on NAS aeronautical safety systems.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Improve safety in the NAS with careful and detailed frequency planning necessary to ensure that current and future aeronautical safety systems are provided adequate radio spectrum in which to operate. In addition, spectrum management support must be provided to both government and non-government offices involved in the operation of current systems and to organizations planning new aeronautical systems.

Category 5

Definition of Category 5: Improve Efficiency of Mission Support

This category contains projects and programs that contribute to the mission of the agency and assist in delivering primary services and meeting strategic and performance goals.

1. FAA Goal: Human and Natural Environment: *Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.*
2. FAA Goal: Organizational Excellence:
People: *Prepare the workforce for the demands of the 21st century.*
Reform: *Become more businesslike while increasing customer responsiveness.*

1. Strategies to Achieve FAA Human and Natural Environment Goals:

Understanding Aerospace Environmental Impacts: *Participate in research to understand more fully the effect of aerospace on the atmosphere and the degree of regulation necessary to minimize those impacts.*
Reducing Aerospace Environmental Impacts: *Use combinations of regulations, research, technology, and procedures to reduce and mitigate adverse impacts from the aerospace.*
Quantify and Mitigate Environmental Impacts of FAA activities: *Assess compliance with environmental regulations; honor the mandates to clean up contamination in accordance with existing agreements; reduce the use of hazardous materials at its facilities; and promote recycling.*

FAA Annual Performance Goals:

Aircraft Noise Exposure – *Number of people in the U.S. exposed to significant noise levels 65 decibels or more. The FY 2003 target is no more than a to be determined number of people.*

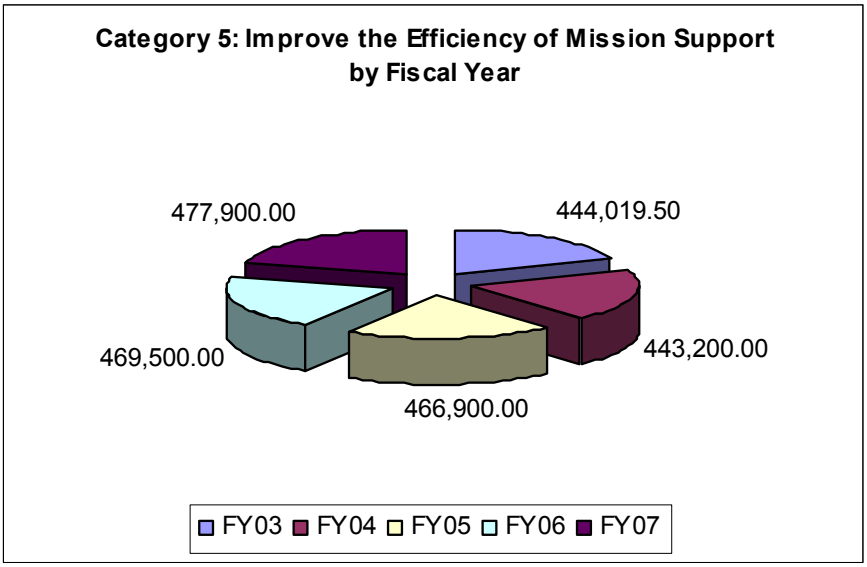
2. Strategies to Achieve FAA Organizational Excellence Goals:

People: *Implement a model work environment, a productive and hospitable work environment, where employees can develop to their potential and contribute fully to the organization. Contributions of all employees are supported and encouraged; discrimination and harassment have been eliminated; and the nation's diversity is reflected.*
Acquisition Reform: *Reform acquisition processes to make them faster, simpler, and more mission-based.*
Personnel Reform: *Reform personnel systems to provide increased flexibility in hiring, pay, and placement; protect employee rights; increase productivity; promote high standards of accountability; enhance the agency's intellectual capital; and create incentives for change.*
Financial Reform: *Reform financial systems to enable a more performance-based management approach.*

FAA Annual Performance Goals*:*

Customer satisfaction – *Gain positive feedback from stakeholders.*
People – *Continue to build a model work environment.*
Financial Responsibility – *Achieve a clean audit and further improve agency accountability by implementing core financial systems.*

The following graph indicates distribution of funding for F&E programs in Category 5: Improve the Efficiency of Mission Support for FY 2003 to 2007. Funding in thousands.



Category 5: 5A01/5A02 National Airspace System Improvement of System Support Laboratory/Technical Center Facilities

- **National Airspace System Improvement of System Support Laboratory**
- **Technical Center Facilities**

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by upgrading and improving the agency's laboratory infrastructure at the WJHTC for the development, testing, upgrades, and second level field support for CIP programs. Each CIP program supported by these laboratories contributes to one or more of the FAA and DOT Goals.

This program improves system efficiency in the NAS by upgrading and improving the agency's infrastructure of test beds that duplicate the NAS environment in a unique, non-operational mode. The WJHTC's System Support Laboratory provides the environment to test, evaluate, and integrate new NAS systems prior to field deployment. These laboratories provide around the clock operations support to all en route and terminal air traffic control facilities throughout the nation.

The WJHTC's multi-user laboratories are engaged in support of virtually all the F&E programs in the CIP. Laboratory groupings include the en route and terminal test beds; navigational, scan radar, and automated tracking sites; communications switching equipment; aircraft simulation systems; and the human factors laboratory. This program funds the operation, maintenance, and enhancements to these test beds and pays for hardware and software maintenance, operations, software licensing fees, and other costs associated with operating the laboratories. The NAS Modernization portion funds enhancements and reconfigurations of the laboratory's electronic data distribution systems, communications systems, climate control system, and power distribution system. This program ensures that the WJHTC's laboratories provide state-of-the-art laboratory environments that support the implementation, testing, and integration of new NAS systems prior to their delivery to the various FAA field sites.

Category 5: 5A03 Technical Center Building and Plant Support
William J. Hughes Technical Center Infrastructure Sustainment

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency in the NAS by refurbishing and replacing aging, obsolete facilities, systems, and equipment. These activities will ensure the WJHTC's ability to sustain its physical structures in its efforts to develop and support a safe, secure, and efficient global aviation system.

Infrastructure sustainment at the WJHTC will improve operational efficiency and effectiveness by replacing aged systems and equipment before serious problems occur. This BLI will also update facilities and facility support systems and reduce energy consumption on a per square foot basis.

The WJHTC owns and operates approximately 1.54 million square feet of test and evaluation facilities, R&D facilities, administrative facilities, and numerous project test sites. The capitalization value of the buildings is estimated at approximately $162.2 million, while the capitalized value of the infrastructure (roads, exterior utilities, etc.) is estimated at approximately $21 million. These values do not include the approximately $65.4 million dollars of environmental funding, received via a national program, that has been expanded to clean up environmentally hazardous sites at the WJHTC as well as replace aged underground storage tanks. Additionally, the values do not include the worth of the land itself, estimated at approximately three million.

This CIP program is the only available funding stream to sustain the 1.54 million square feet of space with the required utility and roadway support systems, which translates to an annual expenditure of approximately 2.4

percent of the WJHTC's capitalization value (including the land) to sustain the investment that the FAA has made in the WJHTC. From another perspective, this expenditure would equate to a sustainment value of approximately $2.90 per square foot. It would seem prudent that with the magnitude of monetary investment at the WJHTC, a sustainment mechanism would exist.

Category 5: 5A05 Department of Defense/Federal Aviation Administration Facilities Transfer
Department of Defense/Federal Aviation Administration Air Traffic Control Facility Transfer/Modernization – Original Program

Primary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century. Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Primary Outcome Goal:
Optimize customer satisfaction with the safety, security, and efficiency of the air transportation system in the United States. This goal requires planning, evaluating, and controlling the system in such a manner as to enable optimizing customer satisfaction, providing funding options together with advantages and disadvantages, then acquiring new systems (e.g., telecommunications, microwave, power supply, short-term emergency power, security, etc.) that are most effective in addressing customer satisfaction. These tasks require providing essential air traffic data to FAA air traffic controllers covering previously controlled DoD airspace in addition to maintaining the safety of the NAS by modernizing facilities and creating communication connections at DoD transferred locations. The DoD identifies sites at the beginning of each FY to transfer to the FAA.

Category 5: 5A09 Federal Aviation Administration Buildings and Equipment
Federal Aviation Administration Buildings and Equipment Sustain Support – Modernize/Improve

Primary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century. Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Primary Outcome Goal:
Optimize customer satisfaction with the safety, security, and efficiency of the air transportation system in the United States. This goal requires planning, evaluating, and controlling the system in such a manner as to enable optimizing customer satisfaction, providing funding options together with advantages and disadvantages, then accomplishing the modifications, sustainment actions, and expansions that are most effective in addressing customer satisfaction. This task involves refurbishing and upgrading existing FAA owned facilities to meet the requirements of new NAS equipment installation and extend the facilities service life to the year 2010. As such, this program improves NAS efficiency through the upgrade and maintenance of existing FAA unstaffed facilities.

The FAA owns thousands of structures, built during the 1940s and 1950s, that have suffered from the effects of exposure to the elements, decay, and inattention and subsequently are in unsatisfactory condition. Problems include leaking roofs, deteriorated foundations, and inadequate air conditioning systems. A majority of these structures are not able to meet current seismic and safety standards. Despite the problems, these facilities house and support critical NAS weather, communication, surveillance, and navigational aids. Most of these facilities require upgrades and expansion to accommodate installation of new NAS equipment. This program will continue to improve NAS efficiency by repairing and upgrading the most in-need/critical facilities.

Category 5: 5A10 Air Navigational Aids and Air Traffic Control Facilities (Local Projects)
Continued General Support – Air Navigation Aids Facilities – Local Projects

Primary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Primary Outcome Goal:
Ensure F&E failures do not jeopardize the safety and efficiency of the air traffic control facilities. Capabilities include communications, surveillance, weather information, and air traffic control facilities.

Examples of completed F&E projects include the following:

- Instituted a second ground control position at the General Edward Lawrence Logan International Airport and the General Edward Lawrence Logan International ATCT;
- Replaced sections of cab glass at the Fayetteville ATCT, which lost pressurization, causing visibility problems and creating a safety hazard;
- Replaced batteries at the VOR navigation aid on Blorka Island, AK, that unexpectedly died.

Local F&E project funds are used for various local minor modifications and alterations that must be made to over 30,000 commissioned air navigation and air traffic control facilities throughout the United States.

Category 5: 5A11 Computer-Aided Engineering Graphics Modernization
Computer-Aided Engineering Graphics Replacement

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency at all regions and centers through the use of enhanced computer-aided design and drafting (CADD) systems coupled with a web-based document management system to improve the FAA's ability to implement capital improvements. The enhanced system will meet increasing user access needs by expanding the system and by providing a flexible system interface to a suite of state-of-the-art graphical modeling and analysis tools and to an underlying secure and reliable engineering library to augment the decision-making process.

The computer aided engineering graphics (CAEG) system will add system efficiency to the NAS by providing mainstream CADD software to reduce file conversion costs, provide secured access via a web browser to specialized applications with an improved user interface needed for equipment siting studies, provide radio coverage, supply electromagnetic interference predictions, conduct aeronautical case study evaluations, and provide a host of other analysis capabilities. A highly scalable and adaptable electronic document management system (eDMS) with a robust workflow engine will be finalized and implemented across the regions and centers to automate and standardize a largely manual and unreliable drawing management process. The overall goal is to deliver system upgrades to enhance user productivity, increase system availability, and improve system reliability and security.

Category 5: 5A12 Information Technology Integration
Federal Aviation Administration Corporate System Architecture – Information Technology Integration

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve operational efficiency and effectiveness by reducing the cost of delivering IT services without reducing service quality, and by optimizing IT decisions and resources across the agency.

The FAA spends in excess of two billion annually on IT, making it a high-volume buyer of IT services, such as voice and data communications, desktops, and database management systems. The agency will significantly improve the cost-effectiveness of IT by standardizing what it buys, by leveraging its position with vendors as a high-volume buyer, by coordinating the purchase and operation of related IT services, by creating the right management processes and incentives, and by adhering to an agency-wide IT architecture. Reducing costs rather than just reducing the rate at which costs rise is necessary given projected agency budgets. The FAA will improve its understanding of the total cost of ownership from conception through implementation, operation, and eventual retirement of major systems. Better insight into total cost of ownership will enable lower overall systems costs.

The FAA is acquiring, developing, and operating over 400 IT services and information systems that enable the agency to carry out virtually all of its mission and business functions. New management techniques will be implemented to improve critical investment decisions and to more effectively carry them out. Related IT systems will be grouped into portfolios and managed to optimize the performance of the whole portfolio to support agency business objectives. Key processes on which execution depends will be re-engineered and systematically improved.

Category 5: 5A14 Logistics Support Systems and Facilities
Logistics Support Systems and Facilities – Asset and Supply Chain Management

Primary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Primary Outcome Goal:
Improve operational efficiency and effectiveness throughout the agency by exercising effective control of assets and providing full life cycle management.

The Asset and Supply Chain Management (ASCM) Program improves operational efficiency and effectiveness by providing a single, integrated planning, inventory, and asset management solution capable of producing effective performance, financial, and logistics information. ASCM's automated data collection capability will supply complete logistics information to all lines-of-business (LOB) engaged in strategic decision-making. It will aid FAA users in managing perpetual inventories in the field and support enhanced requisitioning capabilities by matching live data to the requisition process. ASCM will enhance staff productivity and decrease operational costs by cutting massive paperwork activities. It will facilitate accurate inventory planning by reducing on-hand inventory levels, shrink supply support delays associated with mistaken or insufficient information, and improve field technician effectiveness by aiding in the rapid deployment of assets.

Currently, the FAA has no single, integrated system to accurately and completely account for agency assets valued at over $15 billion. Incomplete, conflicting, or missing financial and logistics information is being used as the basis for agency decision-making and financial reporting, thereby jeopardizing efforts to maintain standards for financial management, cost accounting, and a clean financial statement. By centralizing asset data, the ASCM Program will provide full life cycle cost and performance data, support the FAA's new cost accounting system, and provide asset information for capitalization, work-in-process, and depreciation calculations. ASCM will encompass functionality to replace multiple legacy systems in whole or in part, including the logistics and inventory system.

Category 5: 5A16 Facility Security Risk Management
Facility Security Risk Management

Primary Outcome Goal: FAA Goal: National Security: Prevent security incidents in the aviation system.

Narrative for Primary Outcome Goal:
Improve and/or enhance physical security at all FAA staffed facilities in accordance with FAA Order 1600.69a. This order delineates requirements for physical security protective measures, and establishes standards, objectives, procedures, and techniques for the protection of FAA employees, agency property, facilities, contractors, and the

public. This order clarifies and updates facility security procedures for all FAA facilities, and establishes standards for facility security management, control, and safeguarding of assets and facilities.

The Facility Security Risk Management (FSRM) Program will continue to upgrade and accredit staffed facilities and procure additional security systems to enhance the protection of FAA employees, facilities, and assets. Various measures will be implemented to enhance physical security at all FAA staffed facilities. These measures include, but are not limited to, installation of surveillance, intrusion detection, and access control systems; addition or repair of fences, locks, and doors; and at some of the more critical facilities, addition of guard services. Other facility improvements include parking control, lighting, occupant emergency plans, intelligence sharing, physical barriers, shipping/receiving upgrades, employee/visitor identification, and blast hardening, where applicable.

Category 5: 5A17 Information Security
National Airspace System Information Security – Information Systems Security

Primary Outcome Goal: FAA Goal: National Security: Prevent security incidents in the aviation system.

Narrative for Primary Outcome Goal:
Safeguard information assets.

The increasing growth of cyber attacks and terrorism on critical infrastructures such as the NAS calls for a national effort to protect the increasingly vulnerable and interconnected U.S. computer and communications infrastructure. Vulnerability assessments and reviews of critical systems have identified protection requirements. A June 2000 GAO review of information security on computer systems cited progress the FAA is making, but it also identified key vulnerabilities that the FAA needs to address to detect and prevent information security breakdowns and denial of service attacks. In addition, the FAA must continue to comply with requirements of OMB Circular A-130, the Computer Security Act of 1987, as well as other Federal laws, Executive Orders, and policies.

The mission of the FAA's ISS Program is to protect the FAA's information infrastructure and help the aviation industry reduce security risks through leadership in innovative information assurance initiatives.

The increasing number of network-based attacks, the reliance on the Internet (which is susceptible to attacks) for quickly communicating information, and the vulnerability of cyber terrorists exploiting information systems require a rigorous information security approach to protect FAA information systems. The ISS Program requires substantial investment over several years to certify and authorize the more than 100 systems in the FAA's response to Presidential Decision Directive (PDD) 63 and the more than 600 agency mission support systems. In addition to national security, disruption of the modernized NAS would pose significant threats to safety, and could have considerable impact on the national economy. The FAA must address issues associated with ISS to ensure that its computer and communication systems will continue to support the FAA mission.

Category 5: 5A18 Distance Learning
Distance Learning

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Maintain operational efficiency and effectiveness in training delivery to the FAA workforce throughout the world by keeping a highly reliable and easy to use distance learning infrastructure available at every location. This program will design and provide a standard state-of-the-art computer-based instruction (CBI) delivery system for all CIP programs to support rollout and initial operational and maintenance training.

Also, this program will improve operational efficiency and effectiveness in air traffic control, airway facilities, and regulatory standards training through the following:

- Advanced simulation and training delivery capability at all field learning centers;
- NAS equipment sub-system mock-ups interfaced to CBI.

The Distance Learning Program is required to deliver technical training across the FAA to include air traffic, airway facilities, regulatory standards, IT, and other general topics. Given the ever-increasing cost of maintaining a well-trained FAA workforce, it is imperative to achieve training efficiencies wherever possible. This program continues to provide and maintain a distance learning infrastructure through upgrades of the learning centers around the world and the network to support them. Special simulators for new NAS systems are supported as required through standard interfaces to the CBI platforms at all learning centers.

The overall payback of the Distance Learning Program (FY 2003 through FY 2007) is over $50 million with an overall benefit to cost ratio of better than 2.8.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Improve safety by reducing operational errors and runway incursions through improved and more accessible training and state-of-the-art simulation techniques.

There is a clear link between the training of FAA personnel and aviation safety. The Distance Learning Program's main concern relating to this goal is for safer skies through proper training. Proper training is strengthened by the use of simulation and other "hands on" methods of delivery. Through CBI simulations, a student can make the mistakes necessary to learn without jeopardizing human life or air safety. CBI training is individual training; each student must experience the training and master it by him/herself, which improves safety. Whether it is an air traffic controller in an en route center or a maintenance technician repairing a radar site, safety is enhanced through training. This program improves FAA training by making it more realistic and more accessible. The training is delivered at the job site rather than a single centralized location, thus making training available when needed and without travel. The training remains available for immediate use for refresher and remediation, which also greatly enhances safety.

Category 5: 5A19 National Airspace System Training Facilities
National Airspace System Training – Modernization

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Maintain operational efficiency and effectiveness in air traffic control training through the replacement of the FAA's outdated ATCT cab training simulator with one that is far more versatile and up-to-date than those currently used by aviation organizations throughout the world.

Also, improve operational efficiency and effectiveness in air traffic control, airway facilities, airports, and regulatory standards training by:

- Upgrading classrooms to provide a more effective, efficient presentation and reducing course delivery costs;
- Replacing outdated laboratory equipment with actual current field test equipment;
- Improving communications between Academy and student and administrative customers, resulting in significant operational timesavings.

This program is expected to perform technical training across the FAA to include air traffic, airway facilities, regulatory standards, and airports. Given the ever-increasing cost of maintaining a well-trained FAA complement, it is imperative to achieve training efficiencies wherever possible. This program is poised for upgrades of the tower

cab simulators at the FAA Academy, as well as the balance of classroom upgrades and implementation of related training systems.

The FAA's only ATCT simulator, the agency's best method to improve runway incursion training for new hires, is 10 years old, equipped with antiquated technology, and in certain areas, lacking spares. The tower cab simulator retrofit will allow the FAA to continue to avoid the cost and time required to train air traffic controllers in the tower cab environment. This program also accesses the technology available to improve efficiencies in the resident training environment. Extensive actual experience in the private sector has repeatedly proven that the introduction of interactive classrooms will decrease the amount of time required to complete training. In the FAA environment, the introduction of interactive classrooms will result in lower per diem and student/instructor salary costs during training. This program's classroom upgrades will include interactive student computers, overhead projection systems, and networking to central servers to enhance the training system. Although the efficiency resulting from the following two initiatives cannot be specifically measured, it is self-evident. The FAA Information Superhighway for Training (FIST) will create an efficient electronic network that seamlessly combines field and resident training into an easily accessible entity. Finally, the Academy's Airway Facilities Training Division has been hampered by the unavailability of adequate current test equipment, which has resulted in students being forced to wait for equipment and Academy graduates not being familiar with the equipment they will use in the field daily. This program's lab/simulation upgrades will remove this concern.

The overall payback of this program (FY 2001 through FY 2011) is over $67 million with an overall benefit to cost ratio of 3.13.

Secondary Outcome Goal: FAA Goal: Safety: Reduce fatal aviation accident rates by 80 percent in 10 years.

Narrative for Secondary Outcome Goal:
Improve safety by reducing operational errors and runway incursions through improved and more accessible training and state-of-the-art simulation techniques.

There is a clear link between the training of FAA personnel and aviation safety. It is a question rarely asked until a catastrophe occurs. This program's main concern is for safer skies through proper training. This proper training is strengthened by the use of simulation and other "hands on" methods of delivery. In this realm, a student can make the mistakes necessary to learn without jeopardizing human life or air safety. Whether it is an air traffic controller in an en route center or a maintenance technician repairing a radar site, safety is enhanced through training. This program will improve FAA training by making it more realistic. Of course, without expensive, long-term studies, the link between training and aviation safety will remain largely undefined. However, improved realism increases training quality, and increased training quality leads inevitably to an increase in safety.

Category 5: 5A21 Program Support Leases
Continued General Support – Program Support Leases

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Assure efficient application of FAA and aerospace resources by providing payment for existing leases for land and space that directly support NAS operational facilities and critical components of an aerospace transportation system that meet the needs of users.

Category 5: 5A22 Logistics Support Services
National Airspace System Regional/Center Logistics Support Services

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by providing real estate, acquisition, and material management functions at regions and centers, as required, to field modernized NAS equipment, systems, and facilities within the timeframes established by the programs included in the CIP. Compile and maintain adequate documentation, suitable for independent audit, to establish the capital cost of facilities throughout the FAA.

Category 5: 5A23 Mike Monroney Aeronautical Center – Leases
Aeronautical Center Lease

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve operational efficiency and effectiveness by providing up-to-date facilities and supporting infrastructure that meets the needs of FAA mission support organizations located at the Aeronautical Center.

The Aeronautical Center lease provides more than 1090 acres of land, over 90 buildings, towers, streets, and infrastructure for the purpose of housing FAA mission support services. Services include training for over 30,000 FAA and international students per year in resident and distance learning formats (Academy, Transportation Safety Institute, and U.S. Coast Guard); logistics and supply support to all FAA airway facilities locations, air traffic, and approximately 70 DoD and international organizations; cost accounting and payroll services for the FAA and other DOT organizations; engineering services for NAS systems modification and repair; flight check for calibration/certification of radar/navigation aids at all nation-wide locations; Airmen and Aircraft Records and Registry; aviation medical research and human factors research; maintenance, administrative, and other support services for the FAA; and support to critical air navigation systems throughout the NAS.

Secondary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century. Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Secondary Outcome Goal:
Provide adequate facilities and infrastructure for organizations supporting the agency's model work environment initiatives.

Continue to build model work environments through the improvement of facilities and infrastructure supporting employee services, such as child care, wellness centers, employee credit unions, food services, parking, the ADA, equal employment opportunities, postal services, employee training and development opportunities, and physical security.

Category 5: 5A25 Transition Engineering Support
National Airspace System Implementation Support Contract

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency by providing professional and technical support services to the FAA in over 13 functional areas, including implementation and integration planning, engineering, automation, air traffic systems requirements, project management, environment, and other technical specialties. The primary function of the NAS Implementation Support Contract (NISC) is to assist the FAA in ensuring that over 80 CIP projects are completed on schedule and within budget and meet specifications and quality standards. NISC is a contract support CIP project.

Category 5: 5A26 Federal Aviation Administration Corporate System Architecture
Federal Aviation Administration Corporate Systems Architecture – Information Technology Infrastructure

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Improve system efficiency for the following IT programs: Enterprise Network, Metropolitan Area Network, Internet/Intranet, and the web. The programs will enhance the agency's systems for its internal customers.

These improvements will increase the quality of IT program products and services, such as anti-virus software, bandwidth, extranet firewall, multi-media communication, and Internet web. The anti-virus software will provide the latest software tools to constantly monitor and scan the system for authorization access, viruses, Trojans, and worms. Enhancements to bandwidth will increase the speed of the Internet connections and reduce the bandwidth usage during the workday. Improvements to the extranet firewall will provide hardware necessary to host the extranet firewall so that extranet traffic will have a stringent rule set and will alleviate the traffic going across the primary firewall. Multi-media improvements require hardware to implement a converged network for video and voice capabilities. The Internet/Intranet enhancements provide industry-quality web servers, database support hardware, security hardware, locational security and software for the servers, automated routines, and diagnostics.

The overall benefits of these products and services (e.g., anti-virus software and the extranet firewall) will lower cost and increase system efficiency.

Category 5: 5A27 Technical Support Services Contract
Technical Support Services Contract

Primary Outcome Goal: FAA Goal: System Efficiency: Provide an aerospace transportation system that meets the needs of users and is efficient in the application of FAA and aerospace resources.

Narrative for Primary Outcome Goal:
Perform site surveys and preparation and equipment installation for large F&E programs as they move from acceptance to the field delivery phase. The Technical Support Services Contract (TSSC) is an enabling vehicle that expands and contracts with work requirements and available F&E funds.

TSSC funding enables the FAA to effectively plan and implement NAS programs that provide system efficiency as expected by the aviation community. It provides supplemental resources to assist the F&E organizations to accomplish NAS Modernization, thereby providing a safe, secure, and efficient airspace system. It is through this contract that many sites are prepared for equipment installation. The average FY 2003 cost per staff year for TSSC

is approximately $98,000. This amount includes all associated contract labor and travel cost (salary, travel, general and administrative overhead, and fees).

Category 5: 5A28 Resource Tracking Program
Continued General Support – Resource Tracking Program

Primary Outcome Goal: FAA Goal: People: Prepare the workforce for the demands of the 21st century. Reform: Become more businesslike while increasing customer responsiveness.

Narrative for Primary Outcome Goal:
Improve organizational excellence by providing a diverse set of tools to support and enhance F&E project management.

The Resource Tracking Program (RTP) is used by the regions, implementation centers, and the Aeronautical Center to identify requirements, prepare internal budgets, plan implementation, estimate resources, track the status of projects, measure performance, and report on F&E projects (from inception through capitalization) to upper management. RTP enhances the productivity of the F&E workforce by providing greater visibility to the FAA engineers and managers on the status of F&E projects, and by supporting standardized project management processes across the ATS.

Category 5: 5B01 National Airspace System Facilities Occupational Safety and Health Administration and Environmental Standards Compliance
National Airspace System Facilities Occupational Safety and Health Administration/Environmental Standards Compliance

Primary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Primary Outcome Goal:
Implement programs for OSHA and Environmental Compliance, Fire Life Safety (FLS), and Energy Conservation. Ensure a safe and healthful workplace for FAA employees, and protect the environment through sound environmental and energy efficient practices.

FAA employees are exposed to a variety of chemical, physical, and biological hazards on the job. This program implements procedures to identify and eliminate workplace hazards. Through proper handling and disposition of hazardous materials, the agency will minimize hazardous waste and environmental liability. The FLS Upgrade Program will protect NAS operations by ensuring employees' safety in the event of a fire in an ATCT. In addition, implementing energy conservation measures, including identifying inefficient resource utilization and then developing solutions, will help eliminate excessive costs.

Category 5: 5B02 Fuel Storage Tank Replacement and Monitoring
National Airspace System Facilities Occupational Safety and Health Administration & Environmental Standards – Fuel Storage Tank Replacement and Monitoring

Primary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Primary Outcome Goal:
Meet the FAA goal of protecting and enhancing communities and the natural environment affected by transportation. Also, future associated liability costs will be minimized, and the FAA will be in compliance with

State and Federal regulations governing fuel storage tank systems. Reducing or eliminating damage to communities and the natural environment will strengthen the linkage between transportation and environmental policy.

Category 5: 5B03 Hazardous Materials Management
National Airspace System Facilities Occupational Safety and Health Administration & Environmental Standards Compliance – Environmental Cleanup/Hazardous Materials

Primary Outcome Goal: FAA Goal: Human and Natural Environment: Maintain the number of people exposed to aircraft noise at current levels despite increasing operations.

Narrative for Primary Outcome Goal:
Ensure compliance with statutory mandates and identify appropriate procedures for proactively managing hazardous materials (HAZMAT) to prevent future environmental contamination and notices of violations. This program will improve the quality of human health and the environment by removing HAZMAT that is carcinogenic and materials that destroy living organisms (animal or plant).

This program improves human and natural environment through the identification, assessment, and remediation of contaminated FAA sites. Site identification occurs through employee interviews, public notifications, and historical site reviews. Site assessments and investigations determine the extent of the contamination and impact on human health and the natural environment. HAZMAT support personnel and contractors conduct the remediation activities. The national environmental site cleanup tracking system tracks the number of sites and status of each contaminated site. Based on the present number of FAA contaminated sites on the Environmental Protection Agency (EPA) docket, this program has received "no further remedial action planned (NFRAP)" status at 97 percent of the presently known FAA sites. This progress supports the DOT Goal to increase the total number of NFRAPs for DOT sites on the EPA Docket.